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Table of Contents

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ORIGINAL ARTICLES— PAGE.

"Some Observations on the Bacterial Flora of the Female Genital Passages in Pregnancy and the Puerperium, with Special Reference to Puerperal Infection," by LUCY M. BRYCE, M.B., B.S., B.Sc. .. 102

"The Radiological Aspect of Diseases of the Stomach and Duodenum," by PHILIP PARKINSON 114

"Pyeloscopy," by J. LEON JONA, D.Sc., M.D., M.S. .. 118

REPORTS OF CASES—

"Narcolepsy," by HASTINGS WILLIS, B.Sc., M.B., Ch.M. .. 119

"Recovery in Blackwater Fever After Blood Transfusion," by R. J. WRIGHT-SMITH, M.D. 120

REVIEWS—

An Anatomical Atlas .. 120

LEADING ARTICLES—

A Phase in Post-graduate Teaching .. 121

CURRENT COMMENT—

Gastro-Enterostomy .. 122

Rupture of the Heart .. 123

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Medicine .. 124

BRITISH MEDICAL ASSOCIATION NEWS— PAGE.

Scientific .. 128

Nominations and Elections .. 129

POST-GRADUATE WORK—

Special Lectures in Sydney .. 130

The Refresher Course in Melbourne .. 130

SPECIAL CORRESPONDENCE—

London Letter .. 131

PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—

New South Wales .. 131

BOOKS RECEIVED .. 132

DIARY FOR THE MONTH .. 132

MEDICAL APPOINTMENTS .. 132

MEDICAL APPOINTMENTS VACANT, ETC. .. 132

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 132

EDITORIAL NOTICES .. 132

SOME OBERVATIONS ON THE BACTERIAL FLORA OF THE FEMALE GENITAL PASSAGES IN PREGNANCY AND THE PUERPERIUM, WITH SPECIAL REFERENCE TO PUERPERAL INFECTION.

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THIS report is based on investigations made on behalf of the Melbourne University Obstetrical Research Committee, with the following objects:

1. To obtain knowledge of the organisms found in the genital passages (*a*) in cases of fever following childbirth or abortion, (*b*) during pregnancy and (*c*) during labour and the puerperium in women who had previously been examined during pregnancy.

2. To consider the bacteriological findings in each type of case in relation to the clinical course of the puerperium and thus to assess the part played by the preexisting vaginal flora in the production of puerperal fever.

3. As the many researches on these lines carried out in other countries have had such varying and sometimes conflicting results, it was thought that differences due to local hygienic conditions or variations in immunity might be revealed by such an investigation in Australia.

The patients examined may be divided into three groups consisting of: (i) Fifty, delivered in or admitted to the Women's Hospital, in whom there was fever following childbirth or abortion, and who were examined *post partum* only.

(ii) One hundred and nineteen (eighty-six from the Women's Hospital and thirty-three from the Queen Victoria Hospital) who were examined while attending ante-natal clinics. For the purpose of ascertaining the types of organism habitually present in the vagina, the cervix in the region of the external *os* was chosen as the best site from which to take cultures. As far as possible these examinations were made at about the thirty-sixth week of pregnancy. It was thought that the bacteria found at this time would be more representative of the normal vaginal flora than those found on admission to the labour ward. There was also opportunity for reexamination before delivery if required.

(iii) Thirty patients from Group II (fourteen from the Women's Hospital and sixteen from the Queen Victoria Hospital) who were subsequently examined during labour and the puerperium.

Dr. E. R. White[1] was responsible for swabs from all patients at the Women's Hospital and has already discussed from the clinical standpoint the results of some of these investigations. At the Queen Victoria Hospital the swabs were taken by the author in cooperation with Dr. Isabel Ireland and other members of the resident medical staff. The bacteriological examination in cases Numbers 1 to 34 in Group I was made by Miss F. E. Williams. The apparatus used in all cases was the same and is described below.

The technique employed at the Queen Victoria Hospital was as follows: For all examinations the patient was placed in the lithotomy position and the vulval hair was shaved or clipped. Swabs, soaked in biniodide of mercury solution and thoroughly wrung out to insure that the liquid did not enter the vagina, were applied for some minutes to the labia and *introitus*. With the labia held widely apart a sterilized Sims's speculum was inserted and held in position against the posterior wall of the vagina. The anterior wall was also retracted, giving good exposure of the cervix the appearance of which was noted. At first there was occasional difficulty in avoiding contact of the tip of the speculum with the cervix. Since the former was sterile and at no time came in contact with the vulva which in any case had been prepared by treatment with antiseptic, contamination from this source during the taking of swabs can be excluded.

Cervical cultures were taken with an ordinary sterile throat swab. In pregnancy and the puerperium this was inserted just into the external *os* for a few seconds; during labour if the *os* were widely dilated, it was rubbed over the posterior lip of the cervix.

For taking cultures from the cavity of the uterus a special swab designed by Dr. C. H. Kellaway and Miss F. E. Williams was used. It was made of cotton wool mounted on thin wire, encased in two glass tubes, the inner 22·5 centimetres (nine inches) and the outer 12·5 centimetres (five inches) long. The end of the inner tube from which the wire handle of the swab projected, was plugged with cotton wool sufficiently loosely to allow movement of the wire carrying the swab. The two glass tubes were separated by a thin layer of cotton wool at this end which also allowed movement. The other end of the inner tube in which the swab rested, was not plugged, but was covered by the outer tube which projected about 2·5 centimetres (one inch) beyond it, and was firmly plugged. The whole was wrapped in paper and sterilized. The wrapping could be removed immediately before use without interfering with the sterility of the swab and its glass coverings.

These swabs were made in three sizes, the diameters of the outer tubes being approximately 1·0, 0·75 and 0·5 centimetre respectively. One of the two larger ones was used after childbirth, according to the size of the *os*, as judged by inspection and the smallest after abortion, in the following manner: With the plug removed, the outer tube was inserted into the external *os*, the inner pushed beyond it for about 3·75 centimetres (an inch and a half) or till it could be felt to slip past the internal *os*. The swab was then pushed forward for another 2·5 centimetres (one inch). Each part was withdrawn in reverse order, thus avoiding contamination from other parts of the genital canal. These operations were carried out with the utmost gentleness. Occasionally there was some resistance to the passage of the inner tube and swab. In the few cases in which this could not be overcome without

force by changing the angle of the swab slightly, the examination was not proceeded with. It was also considered inadvisable to take swabs, a procedure involving pressure on wounded tissue, during the early part of the puerperium, if there had been lacerations or episiotomy wounds requiring suture.

Some General Bacteriological Considerations Affecting the Investigation.

Media.

At the outset one is faced with the difficulty of creating *in vitro* conditions similar to those existing in the body. No artificial medium is available which wholly meets these conditions and which is capable of supplying the needs of the various organisms which may coexist in the adaptable environment of living secreting tissue. It is difficult, therefore, to obtain an exact representation of the flora of the living body, especially as regards the relative preponderance of the various species.

The discrepancy between the findings from smears from the cervix or vagina and cultures from the same site which has already been noted by many authors, emphasizes this point. In smears bacilli usually predominate, whereas in cultures often only cocci are grown. This fact is obviously related to the selective action or limitations of the media employed. Most of the earlier workers used broth with or without glucose or agar. These media are unfavourable to the vaginal bacilli, but allow free growth of staphylococci and the hardier types of streptococcci.

If the aim of the research is the systematic study of any one species, frankly selective media are desirable. While the criteria established in this way form the only sound basis for a classification of the flora of any region, the correlation with clinical findings of the results of such an investigation by itself, without due consideration of all factors, may tend to stress unduly the importance of any organism specially favoured by the media employed.

As it was impracticable to use the large range of media which would be required to isolate with any certainty all possible inhabitants of the vagina, after some preliminary experiments blood agar (5% citrated horse blood in hormone agar) and dextrose brain broth (1% dextrose, about two grammes each of brain tissue and of calcium carbonate and 1% Andrade's indicator in fifteen cubic centimetres of nutrient broth) were chosen as the most generally suitable. These media were rich in organic matter and sufficiently well buffered to encourage a good growth of delicate organisms such as the vaginal bacilli, hæmolytic streptococci and gonococci, without inhibiting that of other strains. They did not, however, reveal the presence of such genera as trichomonas, spironema, streptothrix *et cetera*. Different authors have isolated these organisms by appropriate selective methods from the female genital passages both in health and disease, so that it is possible that they may have been present in some of the cases in this series.

The method of culture adopted was to rub the swab over the surface of blood agar plates, one for aerobic and one for anaerobic growth and then to insert it into a tube of dextrose brain broth. All cultures were inoculated at 37° C. and examined at appropriate intervals. The broth was plated if necessary and the colonies from all plates were picked off for further investigation. To achieve the most accurate results inoculation of media should be made immediately the swab is taken. This was done at the Queen Victoria Hospital, but was not practicable owing to transport difficulties with the material at the Women's Hospital which was usually cultured after an interval of one to two hours.

We could not arrange to inoculate blood agar plates with swabs taken during the first stage of labour, if this occurred at night. In such cases the swabs were inserted immediately into dextrose brain broth and plated as soon as possible. Although unavoidable, this procedure was less efficient than direct plating, as even when various types of organisms could be seen in the primary fluid culture, the hardier ones, if at all numerous, tended to outgrow the more delicate, such as the vaginal bacilli, so that it was not always possible to retrieve the latter for further investigation.

Anaerobiosis.

All swabs were cultured anaerobically as well as aerobically. McIntosh and Fildes's jar and methylene blue indicator[2] were used. The air was exhausted as completely as possible with a water pump and replaced with hydrogen to a pressure of a little over one atmosphere. Occasionally at this stage the top of the indicator showed faintly blue, but as it always became colourless within an hour or two at 37° C., it was not considered necessary to use the electric current to hasten catalysis on the surface of the palladium gauze.

Anaerobiosis favoured the isolation of the vaginal bacilli and of a small pleomorphic organism which was fairly common. It also revealed the occasional presence of an anaerobic streptococcus, of *Bacillus welchii* and of a few unidentified anaerobic bacilli. It did not in this series increase the number of hæmolytic streptococci isolated or appear to influence to any noteworthy degree the production of hæmolysis, as it did in the series recently reported by Burt-White and Armstrong.[3]

Nomenclature.

In view of the various methods of classification in existence at the present time, one is sometimes left in doubt as to the criteria adopted by different authors in the naming of organisms. For example the term *Streptococcus pyogenes* is sometimes used to include a wide, sometimes a very limited group. The following notes indicate the criteria I have applied in doubtful cases.

Streptococci.

All strains of streptococci have been named according to Holman's classification.[4] Some have been more fully investigated with reference to morphological and cultural characteristics, hæmolytic action on red cells, bile solubility, fermentation of inulin and raffinose and virulence to mice.

Enterococci.

The organisms called enterococci satisfy the requirements for Holman's type, *Streptococcus fæcalis*, but they possess the following features which were considered sufficiently characteristic to distinguish them from other streptococci fermenting the same sugars: (i) The cocci are always oval, often pointed, resembling closely the pneumococcus. (ii) They often occur in pairs, the individuals of which are usually at an angle to each other; chains of four or six cocci are common, but longer ones extremely rare. (iii) Colonies on blood agar are greyish white, of larger size and more luxuriant growth than that of other streptococci; they produce no green or hæmolytic change in the medium.

Staphylococci.

The majority of staphylococci has been classed by the action of individual types on lactose and mannite. Using as a basis the terminology of Andrewes and Gordon[5] and of Hine,[6] those fermenting both sugars have been called *Staphylococcus pyogenes* (*albus* or *aureus*); those acting on lactose only *Staphylococcus epidermidis* (invariably white) and those acting on neither *Staphylococcus salivarius*. No strains fermenting only mannite were isolated.

Diphtheroids.

Using a definition based on that given in the Medical Research Council Monograph on diphtheria[7] organisms which were Gram-positive, rod-shaped, sometimes with pointed ends and often with irregularly stained granules or segments and club-shaped swelling of the poles have been classed as diphtheroids. Growth on solid media was luxuriant or sparse.

Vaginal Bacilli.

The organisms which so frequently dominate the bacteriological picture in smears of vaginal secretions have after confirmatory cultural evidence been referred to in this paper by the name vaginal bacilli, so commonly used since the time of Döderlein. The characters and systematic relationships of these bacilli are briefly described in a short separate note in this journal.[8]

RESULTS OF THE INVESTIGATION.

Group I: Patients with Fever Following Childbirth or Abortion.

Fifty patients suffering from fever following childbirth or abortion were examined and the organisms cultured from the cervix and cavity of the uterus were as shown in Table I.

TABLE I.—SHOWING TYPES OF ORGANISMS CULTURED IN FIFTY CASES CHARACTERIZED BY FEVER FOLLOWING CHILD-BIRTH OR ABORTION.

Organisms.	Cervix.	Uterus.
Streptococci	15 cases	18 cases
Staphylococcus albus	19 cases	10 cases
Staphylococcus aureus	2 cases	1 case
Staphylococcus citreus	1 case	0 case
Unidentified Gram-positive cocci	6 cases	6 cases
Gonococci	0 case	4 cases
Other Gram-negative cocci	0 case	1 case
Diphtheroids	8 cases	2 cases
Unidentified Gram-positive bacilli	7 cases	8 cases
Bacillus welchii	1 case	1 case
Other Gram-positive anaerobic bacilli	2 cases	0 case
Unidentified aerobic Gram-negative bacilli	16 cases	1 case
Bacillus coli	5 cases	2 cases

Consideration of these Organisms.

Streptococci were significantly the most frequent individual inhabitants of the uterus in this series of morbid cases, being present in eighteen (36%). Five of the six hæmolytic strains occurred in pure culture and four of them were associated with severe illness. One non-hæmolytic strain was found in almost pure culture in the uterus in a fatal case of pelvic peritonitis, but apart from this non-hæmolytic strains even in pure culture were associated with much milder clinical disturbances than hæmolytic ones.

Staphylococcus albus could not be regarded as pathogenic. It was generally found mixed with other organisms and its presence in pure culture suggested that the invading organisms had not obtained a foothold and that only the most resistant member of the dying flora had survived. A strain which was definitely hæmolytic, was present in the uterus in one case, but it did not appear to be pathogenic.

Staphylococcus aureus was found twice in mixed culture in the cervix and once in the uterus, but as in the latter *Streptococcus fæcalis* and gonococci were also present, no pathogenic rôle could be definitely assigned to the staphylococcus.

Some Gram-positive cocci and other organisms found have not been identified for the following reasons: (i) Appearance in fluid media only, without growth on subsequent plating. (ii) In the first thirty-four cases in the series special regard was paid to streptococci and primary fluid cultures were not plated if no streptococci were seen. (iii) Unfamiliarity of type; for example no name has been given to a Gram-positive coccus resembling the gonococcus in that the cocci lie in pairs with flattened sides adjacent. A similar coccus has been observed by other authors in films from urethral discharges in the male. Other Gram-positive cocci differing culturally or morphologically from staphylococci have occasionally been met with.

Gonococci (present in the uterus in 8% of this series) appear to be fairly common excitors of fever of a characteristic type in which apparent recovery from abortion or childbirth is followed after a varying quiescent period by more or less severe pelvic inflammation. It is remarkable that they were absent from the cervix, a site usually chosen to reveal them in diagnostic investigations. It may be that they can exist even more tenaciously in the uterus than in the cervix; on the other hand, in some of the earlier cases examined the discrepancy may have been due to the fact that cervical cultures were made with a platinum loop, while uterine ones were taken with a cotton wool swab which presumably came into more thorough contact with the mucous membrane.

Diphtheroids and other Gram-positive bacilli, including two sporing forms, were fairly common both in the cervix and in the uterus, slightly more so in the former. They occurred chiefly in mixed cultures in conditions which were clinically only

sapræmic. It is interesting to note that in one of these the organisms present included a hæmolytic streptococcus which was apparently not very virulent for the individual harbouring it. It did not dominate the bacterial picture and the clinical symptoms were mild, with no evidence of blood invasion. In the few cases in which diphtheroids occurred in pure culture, they were luxuriantly growing types and probably represented, as did staphylococci in other cases, the hardiest members of a disappearing flora.

Bacillus welchii was found once in pure culture in the uterus in a case of abortion in which there was only a short period of fever.

Unidentified anaerobic bacilli were occasionally found in grossly mixed cultures from cases of abortion. They did not appear to possess individual significance.

Gram-negative bacilli were present in twenty one cultures from the cervix and in nine from the uterus. Five cervical and two uterine strains which were more fully investigated, were identified as *Bacillus coli* and it is probable from cultural and morphological features that most of the others were also coliform organisms. All except two of the cases in which they occurred, were of fever following abortion, possibly induced without precautions to prevent fæcal contamination. They were most often found in mixed cultures, usually associated with other saphrophytic organisms, but occasionally with pathogenic ones. In one case of pelvic cellulitis there was a profuse mixed growth from the cervix which included *Bacillus coli* and *Streptococcus pyogenes,* but in the uterus the latter was in pure culture. In the few cases in which a coliform bacillus was present in pure culture, ability to outgrow the other organisms seen in smears rather than pathogenicity seems to have determined this result.

Clinical Analysis of Group I.

In twenty-eight cases in this series, including two fatal ones, the patients were febrile when the swabs were taken. In these hæmolytic streptococci were found in the uterus five times (17·9%), non-hæmolytic streptococci six times (21·4%), once in a fatal case and gonococci twice (7·1%). In the remainder, although including the other fatal case, the organisms found could not be considered pathogenic.

The average duration of fever in patients who recovered was 23·4 days when hæmolytic streptococci were present, 8·0 days when non-hæmolytic streptococcci were present, 19·7 days when gonococci were present, 12·7 days when other organisms or none were present.

In twenty-two cases fever was absent or had subsided before the swabs were taken. In these a hæmolytic streptococcus was found in the uterus in one case (4·5%) in which the fever lasted two days, and non-hæmolytic streptococci in six (27·3%) in which the average duration of fever was 2·5 days. Gonococci were found in two such cases (9·1%); in one the symptoms necessitated a period of twenty-three days in hospital, although fever was present only for the first three; in the other after an afebrile interval of nine days there was an acute exacerbation of symptoms with fever lasting seven days. In thirteen the uterus was sterile or contained other organisms. One of these was a non-fatal streptococcal septicæmia with fever for eighteen days, in which the illness commenced five weeks after childbirth. The uterus was sterile, but the infection may have been caused by coitus which had taken place seven days before the onset of the symptoms. In the other twelve patients, not harbouring streptococci or gonococci, the average duration of fever was 1·75 days.

A summary of the flora and clinical features of individual cases in Group I is given in Appendix A.

Group II: Patients Examined During Pregnancy.

Cervical cultures were made from one hundred and nineteen patients (Group II) during pregnancy, but the subsequent history was available only in one hundred and three of these. The organisms grown and their frequency is given in Table II.

TABLE II.—SHOWING ORGANISMS FOUND in 119 CASES IN WHICH THE PATIENTS WERE EXAMINED DURING PREGNANCY.

Organism.	All Cases (119).	Cases with Histories. (103).
Streptococci	23 cases = 19·3%	19 cases = 18·4%
Enterococci	5 cases = 4·2%	5 cases = 4·8%
Staphylococcus albus	34 cases = 28·6%	30 cases = 29·1%
Staphylococcus epidermidis	24 cases = 20·2%	22 cases = 21·3%
Staphylococcus pyogenes aureus	6 cases = 5·0%	4 cases = 3·9%
Staphylococcus pyogenes albus	3 cases = 2·6%	2 cases = 1·9%
Staphylococcus salivarius	3 cases = 2·6%	2 cases = 1·9%
Micrococcus tetragenus	4 cases = 3·4%	2 cases = 1·9%
Unidentified Gram-positive cocci	11 cases = 9·2%	11 cases = 10·7%
Gonococci	1 case = 0·8%	1 case = 1·0%
Unidentified Gram-negative cocci	2 cases = 1·7%	2 cases = 1·9%
Yeasts	17 cases = 14·3%	13 cases = 12·6%
Vaginal bacilli	60 cases = 50·4%	55 cases = 53·4%
Doubtful vaginal bacilli	6 cases = 5·0%	5 cases = 4·8%
Diphtheroids	24 cases = 20·2%	22 cases = 21·4%
Gram-positive cocco-bacilli	5 cases = 4·2%	5 cases = 4·8%
The pleomorphic Gram-positive organism	14 cases = 11·8%	13 cases = 12·6%
Unidentified Gram-positive rods	4 cases = 3·4%	4 cases = 3·9%
Bacillus welchii	2 cases = 1·7%	0 case = 0·0%
Unidentified anaerobic Gram-positive rods	3 cases = 2·6%	3 cases = 2·9%
Bacillus subtilis	3 cases = 2·6%	3 cases = 2·9%
Bacillus coli	2 cases = 1·7%	1 case = 1·0%
Unidentified Gram-negative rods	5 cases = 4·2%	5 cases = 4·8%

It is unfortunate that some patients in whom potentially virulent organisms such as *Bacillus welchii, Micrococcus tetrageneus* and *Staphylococcus aureus* were present, were not available for further examination. The significance of organisms occurring relatively infrequently can be truly appreciated only by the study of much greater greater numbers of cases.

The flora of the vagina during pregnancy has been frequently studied hitherto, chiefly with the hope of throwing light on the following questions: (i) The possibility of endogenous infection; (ii) the ability of the vaginal secretion to exert a bactericidal action on introduced organisms and the influence of this action on puerperal morbidity.

The Possibility of Endogenous Infection.

In regard to the possibility of endogenous infection streptococci are of paramount importance. Many workers have estimated the percentage of cases in which they occur *ante partum* in the vagina. The results, as far as all varieties are concerned, are very discordant, but it is generally agreed that hæmolytic streptococci of the type found in severe sepsis (usually *Streptococcus pyogenes*) are uncommon inhabitants of the normal pregnant vagina. Thus in Lockhart's series[9] of one hundred cases there was only one, and in Bigger and Fitzgibbon's[10] series of one hundred and eight, two hæmolytic strains, neither of the latter being *Streptococcus pyogenes*. Whether the more frequently found non-hæmolytic strains can become virulent or acquire the power of causing hæmolysis and whether pathogenic hæmolytic strains can exist in numbers too small to be detected, as suggested by Lockhart, are controversial points.

In this investigation streptococci, including enterococci, were found *ante partum* in twenty-four of the hundred and three patients with histories (that is, 23·3%). The types were:

Enterococci	5
Streptococcus fæcalis	6
Streptococcus mitis	4
Streptococcus salivarius	3
Streptococcus non-hæmolyticus	1
Streptococcus pyogenes	1
Streptococcus equi	1
Unidentified	8
Total	29

In five instances two types were coexistent in the same case, including one in which the two hæmolytic strains isolated (*Streptococcus pyogenes* and *Streptococcus equi*) were present at different times. This case (Number 164) was the only one in which hæmolytic streptococci were found in the vagina *ante partum* during this investigation. Further notes on these strains are given below in conjunction with the clinical history of the patient who was attending the Queen Victoria Hospital.

The hundred and three patients have been grouped as follows in respect to temperature during the puerperium:

1. Afebrile: Temperature never above 37·2° C. (99° F.). Eighty-three patients.

2. Slightly febrile: Temperature above 37·2° C. (99° F.), but less than 37·8° C. (100·1° F.) for twenty-four hours or on two occasions during the puerperium; also included in this group are patients in whom a higher temperature occurred on one occasion only. Twelve patients.

3. Febrile: Temperature of 37·8° C. (100·1° F.) or over for twenty-four hours or on any two occasions during the puerperium. Eight patients.

In the eighty-three afebrile patients streptococci were present in 19 = 22·9%. In the twelve slightly febrile patients they were present in 3 = 25%. In the eight febrile patients streptococci were present in 2 = 25%.

Conversely one finds that of the twenty-four patients in whom streptococci were present *ante partum*, two (8·3%) were febrile in the puerperium, while the seventy-nine from whom they were absent, included six (7·6%) febrile patients. These figures are too small to be of much statistical value, but they indicate that, in this series at any rate, the presence of streptococci during pregnancy has not materially influenced the morbidity rate. In none of these eight febrile patients was the clinical disturbance severe. In one of the six from whom streptococci were absent, fever, varying from 37·2° C. (99° F.) to 38·3° C. (101° F.) was present for seven days, but in the other five the fever lasted four days or less. It is not considered necessary to discuss the latter six cases more fully, but the clinical and bacteriological findings concerning the two patients who were febrile in the puerperium and who had harboured streptococci *ante partum*, are described below to illustrate the different degrees of importance these streptococci may possess.

CASE I (No. 43).—The patient was a *primigravida*, aged twenty-one years. A swab was taken in the antenatal clinic at the Women's Hospital on October 2, 1926. The smear contained many organisms chiefly Gram-positive diplococci, but also some long slender Gram-negative rods and occasionally Gram-positive rods of vaginal bacillus type. The only organisms isolated on plates were Gram-positive diplococci with flattened sides apposed. In the dextrose brain broth culture there were Gram-negative bacilli with poles staining more deeply than the central portions and Gram-positive cocci in chains. These streptococci could not be further isolated and so apparently were not of great significance. This patient was delivered without instruments at the Women's Hospital after labour taking five hours. A slight tear of the perineum and incompleteness of the placenta were noted. The puerperium was afebrile till the fifth evening, when the temperature rose to 39·4° C. (103° F.); the next five evenings it was 37·2° C. (99° F.), falling below normal in the mornings. It was 38·6° C. (101·6° F.) on the eleventh evening when it was preceded by a rigor. After this it fell and did not reach 37·2° C. (99° F.) again before the discharge of the patient from the hospital four days later. The pulse rate fluctuated with the temperature, but was never above 136. No blood cultures were taken and no localized symptoms or signs were recorded to account for this morbidity and from the bacteriological findings one cannot assume that the streptococci present influenced the course of the puerperium.

CASE II (No. 164).—The patient was a *primigravida*, aged twenty years. An *ante partum* swab was taken at the Queen Victoria Hospital on September 18, 1927. A smear contained vaginal bacilli in large numbers and a few Gram-positive diplococci. Culture revealed a great variety of organisms: a few vaginal bacilli isolated anaerobically only, small anaerobic Gram-positive and Gram-negative rods arranged in palisades, *Staphylococcus albus pyogenes*, large Gram-positive cocci growing in dry, "crumby" colonies, *Streptooccus fæcalis* and *Streptococcus pyogenes*. This was the first hæmolytic streptococcus isolated from the cervix during pregnancy. This patient had had sexual intercourse the previous night; this might account for the divergence between the findings from the smear which contained chiefly vaginal bacilli, and from the culture which produced such a variety of organisms presumably recently introduced. The hæmolytic streptococcus isolated grew in very small, almost pin-point colonies with a small, but definitely hæmolytic halo. In broth cultures the growth was flocculent, leaving the fluid clear and the cocci were slightly oval and occurred chiefly in chains of ten to twenty or more organisms. Lactose and salicin were fermented, but not mannite, raffinose or inulin. A mouse was inoculated intraperitoneally with 0·5 cubic centimetre of an overnight broth culture. It was very sick the next day and was killed. *Post mortem* similar streptococcci were recovered from the peritoneum and heart blood.

In view of the recent coitus and the finding of this organism, the patient was examined again on September 29, 1927. She stated that there had been no sexual intercourse for at least a week, but could not remember whether it had taken place since the previous examination. The smear contained vaginal bacilli in profusion and no other organism was seen. A few vaginal bacilli were seen in dextrose brain broth culture, but were not isolated on plates. There were also large numbers of slightly oval cocci in pairs and short chains in the dextrose brain broth; on plating this broth an almost pure culture of tiny colonies with pale faintly hæmolytic halo was obtained. Similar colonies were found on the direct plates, both aerobic and anaerobic, together with those of *Staphylococcus epidermidis* and a pleomorphic Gram-positive cocco-bacillus growing in tiny dew-drop colonies.

This streptococcus fermented salicin, but not lactose, mannite, raffinose or inulin, differing thus from the previous one. It was pathogenic to mice, a 0·5 cubic centimetre intraperitoneal dose causing death in less than forty-eight hours, with peritonitis and septicæmia. Glucose broth cultures were turbid and not flocculent as were those of the first strain.

This patient was admitted to the Hospital on October 10, 1927, and delivered without instruments after labour lasting five and a half hours. There was a slight mucous tear of the perineum and the membranes were said to be incomplete. No swab was taken in the first stage of labour, but cultures were taken from the cervix and the uterus on the fourth day of the puerperium. Cervical cultures in dextrose brain broth contained streptococci, staphylococci and small Gram-negative cocci and coccobacilli. On plating, *Staphylococcus albus* and a pleomorphic weakly Gram-positive organism, growing in tiny colonies, were isolated. From the uterus a diphtheroid, pleomorphic Gram-positive cocci in small colonies and faintly hæmolytic streptococci were isolated. The latter produced turbidity in glucose broth, fermented salicin, but not lactose, mannite, raffinose or inulin. Thus far it resembled the streptococcus found at the second antenatal examination, but when injected in the same dose into a mouse, it did not cause death.

The temperature of this patient was between 37·2° C. (99° F.) and 37·8° C. (100° F.) with morning intermissions from the second to the seventh day. On the eighth day she complained of nausea and had a slight rigor followed by sweating and a rise of temperature to 38·9° C. (102° F.). The lochia had been offensive. Antistreptococcal serum (thirty cubic centimetres) was given on the eighth evening. Shortly after this, following the change of posture involved in getting out of bed, a large amount of offensive discharge was passed *per vaginam*. The temperature fell to 38° C. (100·4° F.) on the ninth evening, was 37·2° C. (99° F.) on the tenth and thence never above normal. A vaginal examination on the tenth day revealed that the cervix was lacerated, the *os* still open and the uterus enlarged and slightly tender. The pulse rate fluctuated with the temperature, but never rose above 118. The patient was discharged on the sixteenth day in good general condition. Her morbidity may have been due to "sapræmia" with toxic symptoms resulting from absorption of the products of bacterial growth and decomposition of retained secundines or in view of the tenderness of the uterus, some local infection may have been present. It is difficult to assess the influence of the streptococcus in this case, but judging by the fact that in the puerperium it was not predominant in either cervical or uterine cultures and by the results of mouse inoculation its virulence appeared to be decreasing. One cannot therefore assume that it played the major rôle in the infection. There is the possibility that the presence of such a streptococcus for at least four weeks prior to labour had stimulated the resistance of the patient.

The Ability of the Vaginal Secretion to Exert a Bactericidal Action on Introduced Organisms and the Influence of this Action on Puerperal Morbidity.

Since the publication in 1892 of Döderlein's monograph, *"Das Scheidensekret und seine Bedeutung für das Puerperalfieber,"* our conception of the bactericidal power of the vaginal secretion has been founded chiefly on his teaching. He held that the normal vaginal secretion was strongly acid and that the only bacterial inhabitant was the large Gram-positive bacillus, which he called the vaginal bacillus, and thought that this organism was responsible for the maintenance of the acidity of the secretion which in turn was the active bactericidal factor. Later work has indicated, however, that the lactic acid is present at birth when the cavity is still sterile and in childhood, when the prevailing organisms may be cocci and also that acidity is not the only factor responsible for the bactericidal action of vaginal secretion.[11]

In this series of one hundred and three patients (seventy-two *primigravidæ* and thirty-one *multiparæ*) vaginal bacilli were present in seventy-two smears and in three cultures in cases in which smears were not taken, that is, in seventy-five cases in all (72·8%); fifty-five of the patients were *primigravidæ* and twenty *multiparæ*. In thirty-four cases vaginal bacilli alone were seen in smears. In twelve of these they were in pure culture, but in twenty-two, one or more other organisms were also grown, these being *Staphylococcus albus* alone (ten cases), diphtheroids (two cases), yeasts (two cases), *Staphylococcus albus* and diphtheroids (two cases), *Streptococcus fæcalis* (one case), *Streptococcus mitis* (one case), enterococcus (one case), yeast and *Staphylococcus albus* (one case), yeast and pleomorphic organism (one case), staphylococcus and unidentified streptococcus (one case). In thirty-eight cases vaginal bacilli and other organisms were seen in smears; in twenty of these no growth of vaginal bacilli was obtained, presumably because the other organisms were present in numbers sufficient to overwhelm the slowly growing vaginal bacilli in artificial media. In the remaining eighteen the vaginal bacilli were present in fluid culture in seven and isolated in eleven.

Of the seventy-five patients in whom the vaginal bacilli were present *ante partum*, four (5·3%) were febrile in the puerperium and of the twenty-eight in whom they were absent, four (14·3%) were febrile. Though these figures are small, they at least suggest a possible association between the absence of vaginal bacilli in pregnancy and an increased morbidity rate in the puerperium. Houlton[12] and some German authors whose original papers are not available, have also been able to establish some degree of correlation between the two conditions.

The fever in all of these cases was of a mild type. It is conceivable that if the organisms present during pregnancy are concerned in the production of fever, they are not of great virulence, perhaps because their introduction or continued presence during a phase of relatively high resistance on the part of the host enables her to develope an immunity, complete or partial, towards them. The history in Case II, Number 164, suggests this possibility. In this case hæmolytic streptococci (virulent at least for mice) and definite lacerations of the cervix and perineum were coexistent, but at the most mild local

APPENDIX A.—DETAILS OF CASES OF FEVER FOLLOWING CHILD-BIRTH OR ABORTION.

Case.	Organisms Cultured from Cervix.	Organisms Cultured from Cavity of Uterus.	Child-birth (C) or Abortion (A).	Number of Days Interval between Birth or Commencement of Abortion and Admission to Hospital.	Number of Days in Hospital.	Day in Hospital on which Swabs were taken.	Number of Days Duration of Fever in Hospital.	Remarks.
3	Anaerobic streptococcus (non-hæmolytic)	Anaerobic streptococcus (non-hæmolytic), *Streptococcus equinus.*	C	3	16	10th	7	Sapræmia; no signs or symptoms of local infection.
37	*Streptococcus pyogenes, Staphylococcus albus* and *citreus*, coliform bacilli.	*Streptococcus pyogenes.*	C	4	23	2nd	18	Pelvic cellulitis; no growth from blood culture.
38	*Streptococcus pyogenes, Staphylococcus albus* and *aureus*, Gram-positive diplococci, Gram-negative cocco-bacilli.	*Streptococcus pyogenes.*	C	5	59	3rd	45	Pelvic cellulitis and abscess; double *phlegmasia alba dolens*; pleural effusion; threatened insanity; no growth from blood culture.
44	*Streptococcus pyogenes.*	*Streptococcus pyogenes.*	C	3	20	1st	7	Abdominal tenderness; severe general symptoms, but no growth from two blood cultures.
7	*Streptococcus salivarius, Staphylococcus albus.*	*Streptococcus salivarius.*	A	2	7	4th	2	
14	*Streptococcus mitis.*	*Streptococcus mitis*, Gram-positive bacilli.	A	6	3	2nd	3	Fatal case of severe pelvic sepsis; no growth from two blood cultures.
17	Unidentified streptococci (grew in broth only).	Unidentified streptococci, staphylococci, Gram-positive and Gram-negative bacilli.	A	6	48	3rd	35	Thrombophlebitis of ovarian veins; emboli.
20	*Streptococcus ignavus*, diphtheroids.	*Streptococcus fæcalis*, staphylococci, diphtheroids.	A	7	8	6th	1	
21	Unidentified streptococci, staphylococci, Gram-negative bacilli.	*Streptococcus pyogenes.*	A	4	10	4th	2	
24	*Streptococcus salivarius*, staphylococci.	*Streptococcus ignavus.*	A	5	7	1st	1	
39	Unidentified streptococci, coliform bacilli, Gram-negative cocco-bacilli.	*Streptococcus equi.*	A	5	78	4th	42	Pelvic cellulitis and abscess, followed later by subcutaneous abscess in right loin.
41	*Streptococcus salivarius, Staphylococcus albus.*	*Streptococcus salivarius.*	A	35	9	2nd	2	Pelvic cellulitis; blood culture on first day yielded *Streptococcus salivarius*; no growth from blood culture on third day.
4	Large Gram-positive diplococci, short Gram-positive bacilli.	*Streptococcus infrequens.*	C	4	79	9th	52	Pelvic cellulitis arthritis; ? pyelitis.
22	Staphylococci, a few streptococci in broth culture.	*Staphylococcus aureus, Streptococcus fæcalis*, gonococci.	A	2	13	4th	3	
28	*Staphylococcus albus*, Gram-negative bacilli.	*Streptococcus ignavus.*	A	8	6	1st	1	
32	Staphylococci, Gram-negative bacilli.	*Streptococcus ignavus.*	A	12	8	4th	1	
46	Coliform bacilli, Gram-negative cocco-bacilli.	*Streptococcus mitis*, coliform bacilli, Gram-positive bacilli.	A	1	15	10th	1	
49	Coliform bacilli.	*Streptococcus pyogenes*, coliform bacilli, Gram-positive bacilli.	A	1	10	2nd	5	
12	Unidentified streptococci, Gram-positive diplococci, Gram-negative bacilli.	Gram-negative bacilli, Gram-positive cocci.	A	10	6	3rd	1	
13	*Streptococcus ignavus*, diphtheroids, *Bacillus welchii* (in smear; no anaerobic culture).	*Bacillus welchii.*	A	1	5	3rd	1	

APPENDIX A (*continued*).

35	*Streptococcus salivarius*, *Staphylococcus albus*, coliform bacilli.	Not examined.	Not pregnant	?	21	10th	3	Lysol douche self-administered two days before admission; pelvic cellulitis.
1	No swab taken.	No growth; Gram-positive diplococci and Gram-negative bacilli (many of both intracellular) seen in smear.	C	9	14	2nd	2	Manual removal of placenta; pelvic cellulitis.
40	Gram-negative bacilli.	Large Gram-positive cocci.	C	4	28	3rd	25	Instrumental delivery; pelvic cellulitis; growth of *Staphylococcus albus* from blood culture.
45	Diphtheroids.	No growth; a few Gram-positive cocci seen in smear.	C	7	56	4th	42	Instrumental delivery; pelvic cellulitis; no growth from two blood cultures.
48	Gram-positive cocco-bacillus.	No growth; a few Gram-positive diplococci seen in smear.	C	27	10	2nd	2	Retained secundines; condition relieved by curettage.
5	*Staphylococcus albus*, Gram-positive bacilli, anaerobic Gram-negative bacilli.	*Staphylococcus albus*.	C	7	17	12th	7	Sapræmia.
26	Gram-negative bacilli.	A few staphylococci.	C	8	11	4th	2	Jaundice; slight tenderness over liver; no growth from blood culture.
36	*Staphylococcus albus*, large Gram-positive bacilli, diphtheroids.	No organisms in smear or culture.	C	40	35	28th	18	Septicæmia; onset of symptoms five weeks after birth and one week after coitus; streptococci (unidentified) grown from blood cultures taken on 2nd and 9th days after admission to hospital; no growth from blood cultures taken on 5th, 12th and 21st days.
2	No swab taken.	Gonococci.	A	21	(1) 8 (2) 34	3rd No swab taken	4 21	Abortion. Five days after discharge from hospital readmitted with further symptoms and large tender mass, which gradually resolved, in right fornix.
10	Gram-positive and Gram-negative bacilli.	Gram-negative bacilli, Gram-positive cocci, a few in short chains.	A	2	17	2nd	3	
18	*Staphylococcus albus*.	No swab taken.	A	4	34	1st	21	Pelvic cellulitis.
25	Gram-negative bacilli.	Gram-positive and Gram-negative bacilli.	A	1	17	1st	4	
27	*Staphylococcus albus*, Gram-positive and Gram-negative bacilli.	*Staphylococcus albus*, Gram-positive and Gram-negative bacilli.	A	3	39	1st	28	Pelvic cellulitis; severe general symptoms, but no growth from blood culture.
30	*Staphylococcus albus*, Gram-negative bacilli.	No organisms on culture or in smear.	A	2	12	2nd	7	Sapræmia.
9	Gram-negative bacilli.	Gram-positive cocci.	A	6	18	2nd	14	
33	Gram-negative bacilli.	Gonococci, a few staphylococci.	A	1	13	4th	Slight fever (between 99° and 100° F.) throughout.	
50	No growth; Gram-positive and Gram-negative cocci and bacilli seen in smear.	On anaerobic culture Gram-positive cocci and large bacilli, and Gram-negative cocci and slender bacilli grown.	A	1	25	8th	25	Fatal case of general peritonitis; no growth from three blood cultures.
6	A few streptococci (in broth only), *Staphylococcus albus* (hæmolytic), Gram-negative bacilli.	*Staphylococcus albus* (hæmolytic).	A	35	7	4th	Afebrile	
8	(1) No growth; intracellular Gram-negative cocci seen in smear. (2) Gonococci (Women's Hospital report).	Gonococci. No swab taken.	A	1	(1) 6 (2) 21	2nd ?	1 7	Complete abortion. Four days after discharge from hospital readmitted with urethritis, cervicitis and salpingitis.
11	No growth; Gram-positive cocci and bacilli and Gram-negative bacilli seen in smear.	Occasional large Gram-positive bacilli in broth cultures.	A	5	8	3rd	1	

APPENDIX A (*continued*).

Case.	Organisms Cultured from Cervix.	Organisms Cultured from Cavity of Uterus.	Child-birth (C) or Abortion (A).	Number of Days Interval between Birth or Commencement of Abortion and Admission to Hospital.	Number of Days in Hospital.	Day in Hospital on which Swabs were taken.	Number of Days Duration of Fever in Hospital.	Remarks.
15	Diphtheroids.	Staphylococci, large Gram-positive sporing bacilli.	A	1	21	2nd	2	
16	Diphtheroids.	Diphtheroids.	A	1	17	12th	Slight fever (between 99° and 100° F.) throughout.	
19	No swab taken.	Gonococci.	? A	?	23	22nd	3	Baby three months old; intermittent hæmorrhage ever since; after admission to hospital, placental tissue expelled; ? as a result of recent child-birth or a fresh abortion.
23	*Staphylococcus albus*, diphtheroids.	No swab taken.	Threatened abortion	14	11	4th	1	No abortion.
29	Gram-negative bacilli.	Gram-negative bacilli.	A	14	10	1st	1	
31	*Staphylococcus albus*, Gram-negative bacilli.	No organisms in smear or culture.	A	1	8	3rd	1	
34	No organisms in smear or culture.	*Staphylococcus albus* (a few only).	A	5	11	4th	1	
42	*Staphylococcus albus*	No growth; Gram-positive and Gram-negative cocci in smear.	A	1	6	4th	3	
43	Staphylococci, diphtheroids.	No organisms in smear or culture.	A	2	6	2nd	No fever	
47	Diphtheroids.	No organisms in smear or culture.	A	4	7	1st	1	

APPENDIX B.—DETAILS OF CASES EXAMINED BOTH ANTE AND POST PARTUM.

Case.	Ante-partum Cervical Swab.	Swab taken during Labour (Cervical).			Swabs taken in the Puerperium.			Clinical Notes.	
	Organisms Cultured.	Condition of Membranes.	Vaginal Examinations prior to Swab.	Organisms Cultured.	Day of Puerperium.	Organisms Cultured from Cervix.	Organisms Cultured from Cavity of Uterus.	Pregnancy.	Type of Delivery and Puerperium.
20	Diphtheroids.	Intact	Yes	*Streptococcus salivarius, Staphylococcus epidermidis*, diphtheroids (two varieties).	1st 6th	No swab taken. No swab taken.	No growth. No growth.	2nd	Normal delivery; afebrile puerperium.
21	*Micrococcus tetragenus.*	Ruptured	?	No swab taken.	4th 7th	No swab taken. No swab taken.	*Micrococcus tetragenus, Streptococcus salivarius.* *Micrococcus tetragenus*, diphtheroids.	3rd	Normal delivery; afebrile puerperium.
27	Diphtheroids, vaginal bacilli.	?	Yes	No swab taken.	4th 7th	No swab taken. No swab taken.	Diphtheroids, Gram-positive sporing bacilli. *Staphylococcus epidermis.*	1st	Labour lasting 55 hours; forceps delivery; mild fever (up to 101° F.) intermittently for 7 days.
34	Vaginal bacilli.	Ruptured	Yes	Enterococci, a few vaginal bacilli.	3rd	No swab taken.	Diphtheroids, *Staphylococcus albus*, enterococci.	3rd	Forceps delivery; afebrile puerperium.
36	*Bacillus coli, Staphylococcus albus*, diphtheroids, vaginal bacilli.	?	Yes	*Bacillus coli*, enterococci. *Staphylococcus pyogenes albus*, diphtheroids.	2nd 8th	Enterococci, *Staphylococcus albus*, diphtheroids. *Staphylococcus epidermidis*, diphtheroid.	Enterococci, *Micrococcus tetragenus*, diphtheroids. No growth.	1st	Normal delivery; afebrile puerperium.

APPENDIX B (*continued*).

37	*Staphylococcus albus*, diphtheroids, vaginal bacilli.	?	Yes	No swab taken.	1st 5th	*Bacillus coli*, *Staphylococcus epidermidis*, *Streptococcus salivarius*. *Bacillus coli*, *Streptococcus salivarius* and *fæcalis*, diphtheroids.	*Streptococcus mitis*, Gram-positive sporing bacillus. *Bacillus coli*, *Staphylococcus albus*, diphtheroids.	4th	Breech delivery; mucous tear; afebrile puerperium.
38	Vaginal bacilli.	?	Yes	No swab taken.	1st 7th	No swab taken. No swab taken.	*Streptococcus mitis*. *Staphylococcus albus*.	1st	Normal delivery; afebrile puerperium.
45	*Staphylococcus albus*, diphtheroids (two varieties).	Intact	Yes	*Bacillus coli*, yeasts, diphtheroids.	3rd 4th	*Staphylococcus albus*, diphtheroids (two varieties), large Gram-positive rods (of *Bacillus subtilis* type). No swab taken.	*Staphylococcus albus*, diphtheroids, large Gram-positive rods (of *Bacillus subtilis* type). *Staphylococcus albus*, diphtheroids.	2nd	Normal delivery; afebrile puerperium.
46	Vaginal bacilli, yeasts.	?	Yes	No swab taken.	7 hours after labour	No swab taken.	*Streptococcus mitis*.	3rd	Normal delivery; afebrile puerperium.
47	*Staphylococcus albus* streptococci (unidentified, non-hæmolytic), yeasts, Gram-negative anaerobic sporing bacilli.	Intact	Yes	*Staphylococcus albus*, streptococci (unidentified, non-hæmolytic), yeasts.	3rd	No swab taken.	Staphylococci, a few unidentified streptococci.	1st	Forceps delivery; slight lacerations; puerperium slightly febrile.
85	No swab taken.	Intact	Yes	*Staphylococcus albus*, streptococci (unidentified), vaginal bacilli.	2nd 6th	No swab taken. No swab taken.	No growth. *Staphylococcus albus*, streptococci (unidentified), diphtheroids.	1st	Forceps delivery; afebrile puerperium.
89	No swab taken.	Intact	No	No growth.	2nd	No swab taken.	No growth.	3rd	Normal delivery; afebrile puerperium.
90	No swab taken.	Intact	Yes	*Micrococcus tetragenus*, *Staphylococcus epidermidis*, diphtheroids, Gram-positive rods (? vaginal bacilli).	3rd 7th	No swab taken. No swab taken.	No growth. No growth.	1st	Forceps delivery; afebrile puerperium.
118	No swab taken.	Ruptured	Yes	*Staphylococcus epidermidis*.	4th	No swab taken.	*Staphylococcus pyogenes albus*, *Streptococcus equinus*.	1st	Normal delivery; afebrile puerperium.
144	*Staphylococcus albus* and *aureus*, vaginal bacilli.	Ruptured	Yes	*Staphylococcus albus* and *aureus*, vaginal bacilli.	5th	*Staphylococcus aureus*, *Streptococcus pyogenes*.	*Staphylococcus aureus*, *Streptococcus pyogenes*.	1st	Forceps delivery; vulval and cervical tears; afebrile puerperium.
145	Vaginal bacilli, yeasts.	Intact	No	Vaginal bacilli, yeasts.	5th	*Staphylococcus albus*, pleomorphic Gram-positive organisms, a few vaginal bacilli.	*Staphylococcus albus*, pleomorphic Gram-positive organisms, vaginal bacilli, diphtheroids.	1st	Forceps delivery; perineal lacerations; afebrile puerperium.
147	*Staphylococcus pyogenes albus* and *aureus*, pleomorphic Gram-positive organisms.	?	No	Admitted in second stage, no swab taken.	1st 6th	*Staphylococcus albus*, streptococci (unidentified), pleomorphic Gram-positive organisms. *Bacillus coli*, enterococci, diphtheroids.	*Staphylococcus albus*, pleomorphic Gram-positive organisms, tiny Gram-positive cocco-bacilli. *Staphylococcus albus*, *Streptococcus mitis*.	3rd	Normal delivery; afebrile puerperium.
148	Vaginal bacilli.	Intact	No	Vaginal bacilli.	3rd 8th	*Bacillus coli*, *Streptococcus pyogenes* (hæmolysis slight), diphtheroids. No swab taken.	No swab taken. *Staphylococcus epidermidis*, diphtheroids, pleomorphic Gram-positive organisms.	3rd	Normal delivery; afebrile puerperium.
153	*Streptococcus fæcalis*, *Staphylococcus salivarius*, vaginal bacilli.	Intact	No	Non-hæmolytic streptococci, vaginal bacilli.	3rd 7th	Non-hæmolytic streptococci, short Gram-negative cocco-bacilli. *Streptococcus fæcalis*, diphtheroids.	No swab taken. No growth.	1st	Normal delivery; afebrile puerperium.
155	Vaginal bacilli, pleomorphic Gram-positive organisms.	Intact	No	Vaginal bacilli, pleomorphic Gram-positive organisms.	2nd 7th	*Staphylococcus epidermidis*, pleomorphic Gram-positive organisms. *Staphylococcus albus*, *Streptococcus pyogenes*, Gram-positive cocco-bacillus.	No swab taken. *Staphylococcus albus*, *Streptococcus fæcalis*, Gram-positive cocco-bacillus, pleomorphic Gram-positive organisms.	1st	Forceps delivery; afebrile puerperium.

APPENDIX B (*continued*).

Case.	Ante-partum Cervical Swab.	Swab taken during Labour (Cervical).			Swabs taken in the Puerperium.			Clinical Notes.	
	Organisms Cultured.	Condition of Membranes.	Vaginal Examinations prior to Swab.	Organisms Cultured.	Day of Puerperium.	Organisms Cultured from Cervix.	Organisms Cultured from Cavity of Uterus.	Pregnancy.	Type of Delivery and Puerperium.
156	*Staphylococcus albus*, streptococcus (unidentified), vaginal bacilli.	?		No swab taken.	12th	Gram-positive cocci (not identified).	*Staphylococcus epidermidis*, *Staphylococcus pyogenes aureus*, anaerobic streptococcus (non-hæmolytic).	1st	Normal delivery; manual removal of placenta; afebrile puerperium.
163	*Staphylococcus epidermidis*, vaginal bacilli.	Intact	No	*Staphylococcus epidermidis*, a few vaginal bacilli, tiny Gram-positive anaerobic cocci.	2nd 7th	*Staphylococcus epidermidis*. *Staphylococcus albus*, diphtheroids, yeasts	No swab taken. A few staphylococci (white), a few diphtheroids.	6th	Normal delivery; afebrile puerperium.
164	First examination: A few vaginal bacilli, *Staphylococcus pyogenes albus*, large Gram-positive cocci ("crumby" colonies), *Streptococcus fæcalis*, *Streptococcus pyogenes*, anaerobic rods (? diphtheroids). Second examination: *Staphylococcus epidermidis*, *Streptococcus equi*, pleomorphic Gram-positive organisms.	—	—	No swab taken.	4th	*Staphylococcus albus*, pleomorphic Gram-positive organisms.	*Streptococcus equi*, diphtheroids, pleomorphic Gram-positive organisms.	1st	Normal delivery; febrile puerperium. (See notes on this case in text.)
165	Gram-positive cocci (unidentified), vaginal bacilli.	Ruptured	Yes	*Staphylococcus epidermidis*.	2nd 8th	*Streptococcus mitis*, diphtheroids, occasional vaginal bacilli. *Bacillus coli*, *Staphylococcus salivarius*, enterococcus, *Streptococcus mitis*, occasional vaginal bacilli.	No swab taken. No swab taken.	7th	Normal delivery; afebrile puerperium.
168	*Staphylococcus albus*, vaginal bacilli.	Intact	No	Staphylococci, vaginal bacilli.	3rd 6th	Non-hæmolytic streptococci, diphtheroids. *Staphylococcus albus* and *citreus*, *Streptococcus mitis*.	*Staphylococcus epidermidis*, *Streptococcus equinus*, diphtheroids. No swab taken.	4th	Normal delivery; afebrile puerperium.
171	*Streptococcus mitis*, vaginal bacilli.	Intact	No	Streptococci (unidentified), vaginal bacilli.	2nd 5th	*Staphylococcus epidermidis*, streptococci (unidentified). *Staphylococcus albus*, *Streptococcus fæcalis*, diphtheroids.	*Staphylococcus epidermidis*, streptococci (unidentified). No swab taken.	1st	Normal delivery; afebrile puerperium.
178	*Staphylococcus epidermidis*, yeasts, vaginal bacilli, pleomorphic Gram-positive organisms.	Intact	No	Vaginal bacilli, yeasts, pleomorphic Gram-positive organisms.	7th	*Staphylococcus epidermidis*, anaerobic non-hæmolytic streptococci, diphtheroids.	Anaerobic non-hæmolytic streptococci.	1st	Forceps delivery; slightly febrile puerperium.
179	*Staphylococcus epidermidis*.	Intact	No	No growth.	2nd 9th	Diphtheroids, Gram-positive sporing bacilli. *Staphylococcus epidermidis*, diphtheroids, pleomorphic Gram-positive organisms.	Diphtheroids, Gram-positive sporing bacilli. No swab taken.	1st	Normal delivery; afebrile puerperium.
180	*Staphylococcus epidermidis*, large Gram-positive cocci (unidentified), pleomorphic Gram-positive organisms, vaginal bacilli, Gram-negative bacilli.	Ruptured	No	*Staphylococcus albus*, pleomorphic Gram-positive organisms.	3rd 7th	*Staphylococcus albus*, *Streptococcus mitis*, diphtheroids, pleomorphic Gram-positive organisms. *Staphylococcus epidermidis*, *Streptococcus mitis*, diphtheroids (two varieties), large Gram-positive cocci.	*Streptococcus mitis*, diphtheroids, pleomorphic Gram-positive organisms. *Staphylococcus epidermidis*, *Streptococcus fæcalis*, diphtheroids (two varieties), pleomorphic Gram-positive organisms.	4th	Normal delivery; afebrile puerperium.
181	Pleomorphic Gram-positive organisms.	?	Yes	*Staphylococcus epidermidis*, *Streptococcus salivarius*, pleomorphic Gram-positive organisms.	3rd 7th	*Staphylococcus epidermidis*, streptococci (non-hæmolytic), diphtheroids, small anaerobic Gram-positive bacilli. *Staphylococcus albus*, *Bacillus coli*, pleomorphic Gram-positive bacilli.	Large Gram-positive cocci, streptococci (non-hæmolytic), pleomorphic Gram-positive organisms. *Bacillus coli*, streptococci (non-hæmolytic), pleomorphic Gram-positive organisms.	4th	Normal delivery; afebrile puerperium.

Nos. 20 to 118 are cases from the Women's Hospital. Nos. 144 to 181 are cases from the Queen Victoria Hospital.

infection occurred. Possibly if the streptococci had been introduced when the patient was exhausted by labour, severe infection would have resulted.

According to the patients questioned, sexual intercourse took place fairly frequently throughout pregnancy in some cases. When it is considered that the vagina is a cavity into which organisms from the air, skin or fæces may be so easily introduced by this or various other means, it is difficult to speak of any type of flora as normal or endogenous.

It appears, however, that in the majority of cases the conditions existing in the healthy vagina are more favourable to the vaginal bacilli (although on artificial media they are delicately growing organisms) than to other strains. The former are often the only species present, so that presumably if the latter are introduced, they are destroyed or survive in numbers so small that they are not evident in smears, but only flourish when placed under the more favourable conditions of culture *in vitro*. If, however, these exogenous organisms are introduced repeatedly or in large numbers, they may eventually overpower the vaginal bacilli after a temporary phase in which both types are present and can be cultured.

While secretions which contain the vaginal bacilli as the sole or chief inhabitants may be therefore considered normal, those in which they are absent are not definitely abnormal in the sense that a pathological condition already exists. The absence of vaginal bacilli or a profuse growth of other organisms in any individual probably does mean, however, either that organisms from without which may include pathogenic types, are being introduced in abundance or that the vaginal secretion is less antagonistic to them than is usual. Whichever factor is responsible, there is obviously greater opportunity for infection in these cases. Whether or not it will result in severe illness may depend partly, as suggested above, on the condition of the host at the time of introduction of the infecting organism.

Group III: Patients Examined in Pregnancy and Subsequently During Labour and the Puerperium.

Of the one hundred and three patients whose puerperal histories were available, seventy-four were patients attending the antenatal clinics at the Women's Hospital, and twenty-nine attended at the Queen Victoria Hospital. Fourteen of the former and sixteen of the latter were further examined during labour and the puerperium.

Whenever possible during labour swabs were taken before the rupture of the membranes and at the Queen Victoria Hospital rectal examinations were substituted for vaginal. Under these conditions the cervical flora during the first stage of labour resembled that found during pregnancy.

In the puerperium, however, a complete change took place. Even in cases in which vaginal bacilli alone or associated only with staphylococci were present *ante partum*, in the puerperium streptococci (occasionally hæmolytic), staphylococci, diphtheroids and coliform organisms were frequently present in both cervix and uterus and vaginal bacilli only in two instances.

Organisms were found in the uterus as early as seven hours after labour, but usually the flora was less profuse on the first to the third days than subsequently.

Two of the patients in this group (Number 164, the details of which are given above, and Number 27, in which *Staphylococcus epidermidis* only was found) developed fever in the puerperium. In the other twenty-eight, streptococci were present in the uterus in seventeen (60·7%), but only two strains were hæmolytic and none occurred in pure culture.

The possibility of other organisms found being concerned with the production of morbidity has always been kept in mind, but these cases give no evidence on this point. The patient with gonococci present in pregnancy had a normal puerperium. A pleomorphic Gram-positive organism has been found fairly frequently. It is a facultative anaerobe and grows in very tiny colonies. Films of these often contain very diverse forms varying from rods, sometimes irregularly swollen at the ends, to tiny cocci with suggestion of arrangement in chains. It was thought that this organism might be the anaerobic *Streptococcus putridus* of Schöttmuller, to which attention has recently been drawn as an excitor of puerperal sepsis,[13] but it lacks some of the features said to be most characteristic of the *Streptococcus putridus*. It is possible also that it may represent one of the forms intermediate between diphtheroids and streptococci described by Mellon.[14]

It will be noted that streptococci were present in a greater percentage in these normal cases (Group III) than in the febrile ones (Group I). The two series are not strictly comparable in that in Group I the swabs were taken over a wide period of time, depending on the development of morbid symptoms and in some instances in fever definitely due to other causes, such as gonococcal infection, while in Group III no patients were examined later than the twelfth day of the puerperium.

The details of cases in Group III are given in Appendix B.

Conclusions.

In cases of fever following childbirth or abortion the presence of a number of organisms in the genital tract, and especially in the uterus, is usually associated with a mild type of disease.

The isolation of one strain only may or may not be significant. Thus, if a hardy saprophyte exists alone, it probably means that the resistance of the host is sufficient to inhibit the growth of harmful parasites. On the other hand, the presence in pure culture of a fastidious organism, such as *Streptococcus pyogenes* or the gonococcus, appears to indicate the accession of invasive power which is associated with virulence for the host. In this condition the organism seems to acquire also the power of dominating in culture more vigorous strains which would usually outgrow it.

Nos. 20 to 118 are cases from the Women's Hospital. Nos. 144 to 181 are cases from the Queen Victoria Hospital.

This work has not indicated whether the association of mild disease with the absence of streptococci means that these organisms have never been present either as preexisting or introduced inhabitants or whether the resistance of the host has been sufficient to inhibit the development of virulence on their part.

Although the number of cases investigated is small, the findings indicate that it is fallacious to regard the presence in the genital passages of streptococci (without further reference to their biological character and consideration of clinical features) as evidence that they are causally related to any disease which may exist (compare Lockhart[9] who apparently regards the mere presence of streptococci as "infection").

The investigation in antenatal cases (Group II) shows that bacteriological examination of the vaginal secretion during pregnancy may be of value from the following aspects: (i) It gives an indication of the personal hygiene of the patient and the influence of this on puerperal morbidity may be studied. (ii) If potentially virulent organisms are found, further observations may be made on their type, their subsequent behaviour and the clinical course of the puerperium. (iii) Unsuspected disease, such as chronic gonorrhœa, may be occasionally detected and its consequences averted.

The results of examination during the puerperium of patients previously examined *ante partum* (Group III) suggest that many of the streptococci found *post partum* are members of the saphrophytic flora which temporarily invades the normal puerperal uterus. These results, therefore, support the conclusions drawn from analysis of the febrile patients comprising Group I that not only the fact that streptococci are present, but also all the other bacteriological and clinical features of any case should be considered in assessing the significance of these organisms in the production of morbidity.

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THE RADIOLOGICAL ASPECT OF DISEASES OF THE STOMACH AND DUODENUM.[1]

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THE discussion of the radiological aspects of pathological conditions of the stomach and duodenum falls naturally under three headings: The method of examination and report, appearances suggesting organic lesions of the organs examined, appearances suggesting abnormalities of function.

THE METHOD OF EXAMINATION AND REPORT.

The almost universal method of examining the stomach and duodenum is that of combined fluoroscopy and radiography, during and after the ingestion of opaque meals. On the morning of the examination the patient is allowed to drink tea, milk or water at 7 a.m., but is instructed to take no food at that time and no food or drink afterwards until he presents himself for examination at 9 a.m. or thereabouts. He is not given an aperient on the previous evening, as this seems to interfere with the motility of the meal. At 9 a.m. a first meal of malted milk, containing 170 grammes of barium sulphate, is drunk while the patient is on the screening stand, so that the contrast medium is actually seen flowing down the œsophagus and filling the stomach. After the screen examination in various planes, films are taken in such positions, either standing or lying as the screen examination suggests will bring out the salient features in the particular

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on April 26, 1928.

case under examination. Two or three hours later the patient reappears for further screening and subsequently returns at the end of five or six hours from the first meal for a second meal of the same kind, when the morning's manœuvres are repeated, more films being taken if necessary. The patient is then instructed to return on the following morning for examination of the bowel by screen and films. I do not think any examination of the bowel is complete without the administration of an opaque enema and if any bowel lesion is in question, an enema of malted milk and barium sulphate is given from a douche can, the opaque fluid being actually watched on the screen as it flows into the bowel; plates are taken subsequently. This is, however, outside the province of the present discussion. In between the times of examination I allow patients who are well enough to do so, to walk about or do anything they wish, provided that they do not lie on their backs if resting and that they take no food or drink. On completion of the examination a report is prepared for the practitioner sending the patient. I have found it the better practice to make no comment to patients on the findings at the examination, although this is very difficult to do, as people seem to expect the radiographer to give a diagnosis and are often very angry when he will not.

The Stomach.

In reporting on the stomach the following headings are usually described: Position, tone, mobility, peristalsis, *incisuræ*, filling defects and evacuation time.

Position.

The position of the stomach varies considerably in different individuals and depends so greatly on the build or habitus of the patient that it is impossible to give any normal position for it. In the hypersthenic type the stomach is the so-called steer horn which lies transversely in the abdomen, even in the standing position, and from this one sees all types of stomach to that of the thin hyposthenic woman, heroine of many a child bed, whose greater curvature may reach the true pelvis and who may still have a stomach of apparently normal function. One comes to look for certain types of stomach in certain types of individuals and it is only when one finds a person of one habitus with a stomach of a different habitus that he begins to consider abnormality of position, for example, a low sagging stomach in a plethoric hypersthenic man suggests an abnormality which is usually found in an obstructive, long standing ulceration of the pylorus or duodenum, whilst the highly placed, fixed stomach in a hyposthenic individual gives one a clue to adhesions from a new growth or an inflammatory process, whether following a previous laparotomy or not. The position of the stomach may also be altered by conditions outside the alimentary tract altogether. Thus one sees the whole gastro-intestinal tract or any part of it displaced in various ways by ascitic fluid, ovarian or uterine tumours, kidney and gall bladder conditions, tumours of the pancreas, enlargements of the spleen, as well as rarer pathological conditions. These things being so, I have formed the habit of using my own judgement as to what might be considered the normal position for the stomach in the particular individual under examination, so that the report reads: "Normal for subject" or the abnormality observed is described and a reason is given for considering such a position abnormal in this individual.

Tone.

Stomach tone must be very important from the clinician's point of view and the tone of the stomach found must, I should think, have an important bearing on the subsequent treatment of the patient. There is again some relation between build or habitus and stomach tone, but it is not so close a relation as that between habitus and position. Hypertonia generally accompanies irritative lesions and is seen in the early stages of duodenal ulcer, gall bladder lesions and in irritative conditions of the bowel, chronic appendicitis or colitis. I am inclined to say that hypertonia and hypoacidity are associated and that the converse is also true, hyperacidity and hypotonia being found together, surely an important factor in the subsequent treatment. In progressive obstructive lesions of the pylorus or duodenum the stomach passes through a preliminary stage of hypertonia, followed by a gradual loss of tone of the stomach, until one sees the low saucer-shaped, sagging stomach, with varying degrees of residue after six, twelve, twenty-four or even forty-eight hours from the ingestion of the meal. Such conditions are said to be more characteristic of slowly advancing, benign ulceration than of carcinoma, as though the stomach muscle at first responds to the commencing obstruction, but later gives up the struggle and resigns itself to the inevitable.

Mobility.

Mobility is determined by the ability or otherwise to move the filled viscus about by palpation with the gloved hand behind the screen. The mobility varies within normal limits, according to build, intraabdominal pressure and the condition of the anterior abdominal wall. The stomach is normally freely movable throughout its greater part and any fixation of the viscus is suggestive of a pathological condition, especially when it is observed in the pyloro-duodenal region, where many both intragastric and extragastric conditions cause fixation or limitations of movement.

Peristalsis.

The peristaltic waves may be observed on the screen examination passing down the stomach and it is well to observe at least one or two waves throughout their whole course. The effective peristalsis is that observed in the prepyloric area and even in ptosed stomachs of poor tone the prepyloric peristalsis may be active enough to secure a normal emptying time or motility of the meal. Peristalsis may be interrupted by an *incisura* which will be described later on, or it may be seen to be absent

over a certain area of the stomach wall which is then usually observed to be irregular and pathological. Hyperperistalsis is seen in irritative lesions and is a valuable indirect sign in pathological conditions of the appendix and gall bladder, whilst the reverse condition is seen in advanced obstructive lesions and in hyperacidity.

Incisuræ.

Incisuræ are the deep contractions of the circular muscle fibres of the greater curvature dividing the contour of the stomach and producing the hour-glass appearance. They are constant in position and may be permanent or transient. Permanent *incisuræ* are seen in the same position at all examinations of the affected stomach and in the case of an organic lesion an ulcer crater or niche on the lesser curvature or posterior wall can usually be seen opposite the *incisura*. Transient *incisuræ* are reflex and may be made to disappear and reappear by palpation or they may be so persistent that they require the administration of belladonna to cause their disappearance. They are reflex contractions and are associated with irritations outside the stomach of which the commonest cause is a pathological condition of the appendix, gall bladder or pancreas.

Filling Defects.

Filling defects of the stomach contour require no great comment. They are irregularities of outline associated with projection into the stomach of tumour masses, the heaped up inflammatory masses surrounding benign ulcer craters, polypi *et cetera*. If a definite constant filling defect is observed, it indicates a pathological condition.

Evacuation Time.

It is to obtain the evacuation time of the stomach more or less accurately that repeated screenings are necessary. The normal stomach empties in three to four hours and any variation in this is a sign of functional or organic abnormality.

The Duodenum.

The whole of the duodenum can usually be observed with a great degree of accuracy. The first part of the duodenum is a definite radiological entity, called the bulbus or cap. It is here that 95% of duodenal ulcers occur and its close relation to the gall bladder makes it a valuable pointer in pathological conditions of this organ. The normal cap is smooth, regular in outline and of the so-called mitre shape. It is freely mobile and it is on the regular filling out of this cap or on the constant deformity of it that the radiographer depends for an opinion as to the normal or pathological condition of the part. It was formerly held that all duodenal ulcers produced some deformity of the cap; whilst this is probably not quite true, it is found in practice that in the vast majority of pathological conditions of the first part of the duodenum some constant definite deformity of the cap is produced. Deformity of the cap, however, is also seen in adhesions and veils of the omentum. The second and third parts of the duodenum may be observed with less accuracy, although abnormalities of them are usually apparent at screen examination.

APPEARANCES SUGGESTING ORGANIC LESIONS OF THE ORGANS EXAMINED.

Stomach.

If it be remembered that what is seen at screen examinations and in skiagrams of the gastro-intestinal tract is really, as it were, a plastic cast of the mucous membrane of the organs, it will be realized how abnormalities in the outline of the contrast medium reflect the appearance of the actual lesion present. If a plaster cast of a deep penetrating ulcer, say of the leg, were taken and the cast were removed and the side of it which has been applied to the leg and ulcer were studied, it would be seen in the region of the ulcer first, a depression made in the plaster by the raised infiltrated edge of the ulcer; in the centre of this there would no doubt be a more or less raised area corresponding to the crater of the ulcer. This is what is seen in X ray examinations of the stomach and duodenum, only the cast is taken of the mucous surface lining the interior of the viscus. Thus it is seen that gastric ulcers usually cause a shallow filling defect of the contour of the stomach in the centre of which is a raised niche where the barium penetrates into the crater of the ulcer itself. In the vast majority these niches representing ulcer crates are seen on the lesser curvature of the stomach, whilst a few occur on the posterior wall, less on the anterior wall and very few indeed on the greater curvature. Opposite a great many of these ulcer niches is seen a deep *incisura* due to a contraction of the stomach muscle and causing the well known hour-glass constriction. These *incisuræ* when seen are permanent and often cannot even be relaxed by deep anæsthesia. They do not, however, always occur opposite ulcer crates and it can be said that in making check examinations of a stomach during treatment the relaxation of the permanent *incisura* and the diminution in the size of the crater are strong evidence that a healing process is occurring. An *incisura* alone is sometimes seen, the ulcer crater being so small that it cannot be picked up on the screen or skiagrams. I feel that this appearance is always due to gastric ulcer, although I am more guarded in the expression of a definite opinion than when a niche can be plainly seen. Many benign ulcers are very large and their edges so infiltrated that they cause large filling defects in the stomach contour and the appearance simulates the next class of organic lesion.

Carcinoma.

In carcinomata of the stomach the infiltration which accompanies the lesion causes a much more definite filling defect in contour than is seen in the benign ulcers described and even where the malignant process has gone on to ulceration, the filling defect masks the presence of the crater. Carcinomata are seen most frequently at the pylorus and

appear to start on the lesser curvature, but very rapidly involve the whole circumference of the stomach wall in their neighbourhood. When these filling defects are discovered, an attempt is made to estimate the area of the stomach wall involved and to ascertain the mobility or otherwise of the lesion, so that the surgeon may make a better estimate of the chances of successful operation. Almost all ulcers of the stomach, whether benign or malignant, cause gastric stasis as shown by an abnormally long evacuation time. Some scirrhous cancers of the pylorus, however, and some carcinomata of the body of the stomach have a very rapid evacuation time, the meal running straight through into the duodenum, but whether this is caused by the hypoacidity or by the mechanical destruction of the pyloric sphincter by the growth, I am not prepared to say. This rapid evacuation time in scirrhous cancers leads to the next class of organic lesions.

Diffuse Fibromatosis or Leather Bottle Stomach.

In diffuse fibromatosis the stomach appears as a narrow, fixed, infiltrated tube through which the opaque medium passes so rapidly that it is even difficult to obtain skiagrams. These conditions have a very low grade of malignancy and I have found them present in a healthy looking old man of eighty, whose affection had been diagnosed twenty years previously as an inoperable carcinoma of the stomach.

Syphilis of the stomach appears to be a somewhat rare lesion and I doubt whether it would be distinguished radiologically from infiltrated benign ulcers or early carcinoma. Of the rarer lesions polyposis of the gastric mucosa which causes gastric delay may be mentioned. Sarcoma has been described as causing a filling defect, but it is extremely rare.

Indications of Malignant Disease.

The radiographer is frequently asked to express an opinion as to whether a lesion of the stomach is malignant or otherwise and as will be seen from the foregoing remarks there are certain appearances which are characteristic of benign ulcers and certain others which are characteristic of malignant growths. There must, however, always be a fair range of cases in which the appearance is doubtful and in which the radiographer cannot be expected to say: "This is malignant" or "that is benign," since the surgeon with his hand in the abdomen on the actual part itself is sometimes not able to do so.

Doubtful Lesions.

Although the X ray examination of the stomach and duodenum has become a very accurate procedure, there are certain cases in which an early lesion is suspected, but in which the appearance is not definite enough to enable the radiographer to say that such and such an organic lesion is present. For instance, an area of the lesser curvature or posterior wall may be seen which is flattened and shows defective peristalsis, or a conical shaped, stiff looking pyloric segment may be seen in a fat man who has only just begun to lose weight, or again there may be an eccentrically placed pyloric sphincter with a slight flattening of the lesser curvature adjacent to it. These are all indefinite appearances suggesting early pathological changes and unfortunately the borderline appearances if they mean anything, mean the very earliest evidence of carcinoma. In such conditions one of those indefinite reports must be given, such as are so frequently condemned as of no value owing to their vagueness. It is my contention, however, that those reports are justified and valuable in that they suggest the necessity of further investigation in a month or six weeks' time, when a fractional test meal has been carried out and every other accessory aid to diagnosis used. I have frequently asked to be allowed to make these further check examinations, even without additional fee to the patient, but very few of the patients come back and I can only hope that no large percentage of them remains undiagnosed until the prognosis is hopeless.

Duodenum.

The appearances suggesting organic lesions of the duodenum are usually those due to spasm of the muscle of the organ causing constant deformities and these spasms are of the same nature as the *incisuræ* seen in the stomach. In duodenal ulcer, although the type of deformity varies greatly in different persons, it is always constant for the particular individual under examination and it may or may not be accompanied by a visible ulcer crater. About 95% of duodenal ulcers occur in the first part and practically all of them cause some characteristic deformity of the cap. Duodenal diverticula are very rare in the first part, but much commoner in the second part and it is probable that stasis in these diverticula causes unpleasant symptoms. Another lesion which may be classified as organic, is the condition described as duodenal ileus. Here some dilatation and hypotonia of the stomach and a more extensive dilatation and hypotonia of the first and second parts of the duodenum are usually seen. The cause of this appears to be a temporary intermittent obstruction of the third part in the mid-line, proximal to which the dilatation occurs and retroperistalsis or writhing duodenum is observed. In these cases there is considerable duodenal stasis and very often a six-hour gastric residue. The most probable explanation of the appearance is that there is ptosis of the abdominal organs with omental drag and pressure from the superior mesenteric artery. Other abnormal appearances in the duodenum are caused by adhesions, post-operative or from the gall bladder or pancreas and omental veils.

THE STOMACH AND DUODENUM AFTER OPERATION.

The examination of patients after operation is always more or less unsatisfactory, although the radiographer is greatly helped if information is available as to the nature of the previous operative interference. I would say that the stomach after gastro-enterostomy empties rapidly, in one to two

hours. If this is not the case, the radiographer can only endeavour to describe the appearance seen and suggest any possible explanation of the delay. Gastric ulcers recurring after gastro-enterostomy will cause delay in evacuation just as they do in stomachs which have not been operated upon. Jejunal ulcers occurring near the stoma also cause spasm with consequent delay and sometimes the craters of these ulcers can be demonstrated. The opinion, however, is often formed that the fault is in the stoma itself and it would seem that many of the openings are made too small in the first place. I take it that the majority of short circuiting operations is undertaken for obstructive lesions, where the stomach is often very greatly dilated and of very poor tone. After the operation the stomach tone recovers, the muscle fibres contract and in a few weeks the stoma is narrowed, contracted and of poor function. I suggest that stomata cannot be made too large and that they are often made too small in the exhausted hypotonic stomach wall.

APPEARANCES SUGGESTING ABNORMALITIES OF FUNCTION.

Of the signs suggesting abnormalities of function the most important is an altered evacuation time. A rapid evacuation time is encountered in irritative lesions and such a lesion of any part of the gastro-intestinal tract appears to affect the whole of it, causing hypermotility of the meal throughout all its stages. Chronic colitis, pathological conditions of the appendix and apparently some pathological conditions of the gall bladder are all instances of extragastric causes of hypermotility of the meal. Hypermotility is accompanied by or caused by a hypoacidity and is also seen in the early stages of duodenal ulcer. A delay in evacuation time is associated with hyperacidity and with such organic lesions as have been previously described, gastric ulcer, obstructive lesions of the pylorus and duodenum and duodenal ileus. Hyperperistalsis and hypertonia are usually seen in association with hypoacid dyspepsia with hypermotility of the meal. There is another type of evacuation time which appears always to be suggestive. In some stomachs a very rapid evacuation is seen at first, so that at the end of two hours the stomach is practically empty, but after this very little meal appears to pass and there is a small but definite six-hour residue. If no organic lesion can be discovered in these stomachs, I incline to the opinion that this disturbance of function is almost always due to a pathological condition of the gall bladder. It is in the realm of stomach function that so much investigation appears to be necessary. In reporting on the condition of a patient when no organic lesion has been found it may be stated that there is hypertonia and an evacuation time of two hours or less, suggesting a hypoacid dyspepsia or that there appears to be a hyperacid dyspepsia because the evacuation time is prolonged to five or six hours with hypotonia and hypersecretion, but there are many disturbances of function which appear to be inexplicable and although certain facts concerning the signs noted can be detailed, if the question be asked in the words of the well known gramophone record: "What Causes That?" in the present state of our knowledge there is no suitable answer. Much work requires to be done in this direction and it will be done only in clinics with a close cooperation between the clinician, the biochemist and the radiographer.

PYELOSCOPY.

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FOR many years pyelography or the radiography of the filled kidney pelvis has been studied. For very many years also it has been recognized that the outflow from a catheter inserted into the normal kidney pelvis is not a constant stream, but is characterized by the regular succession of periods of flow of a few drops of urine with regular intermissions.

It is only in the recent few years that the examination of the kidney pelvis filled with a radioscopically opaque fluid by means of the fluoroscopic screen has been undertaken, first, I believe, by French observers. These observations have disclosed the fact that the musculature of the kidney pelvis can be seen to exhibit regular rhythmic contractions with the expulsion of a "globule" of the opaque fluid into the ureter down which it is rapidly passed by a peristaltic wave. This at once explains the intermittent character of the ureteric outflow and brings the activity of the ureter in line with what is observed in the bowel.

Following on the work I saw in Paris during 1926 and 1927, I have carried out a series of observations at the Women's Hospital, Melbourne. On observation of the contractions of a well-filled pelvis there seemed to be a regular rhythm as follows: A contraction of the upper, middle and lower calyces in fairly rapid succession; an interval of one to three seconds between each calyx contraction, succeeded in a few seconds by a relaxation of that part of the pelvis in relation to the calyces; this then contracts, forcing the fluid into the distal part of the pelvis; the latter contracts almost at once with a snap action, forcing a "globule" into the ureter. This globule is then passed down the ureter by an ordinary peristaltic wave of relaxation followed by a wave of contraction.

The snap-like action of the distal pelvis is very pronounced and is in some cases reminiscent of the action of the ventricle, in fact one may even venture to call this part of the pelvis the "ventricle of the kidney." When pituitary extract is injected intramuscularly, a very interesting effect is produced. In about ten to twenty seconds all parts of the pelvis are thrown into violent rhythmic contractions, the relaxation after the contraction being very rapid and active, while the globule is forced down the ureter so quickly as to be hardly observable. At the same time the pain of which the patient com-

plained as a result of the "Lipiodol" injection, immediately disappeared.

The recognition of this active contractibility of the kidney pelvis opens up many problems of kidney physiology and pathology, more especially the difference in prognosis and treatment of an actively contracting pyelonephrosis in contrast to the inert sac-like dilated pelvis for which removal is obviously indicated. Similarly, in a case of hæmaturia where a growth of the kidney is suspected, if pyeloscopy shows that one or two calyces are not working while the rest of the pelvis is functioning well, a tumour of the kidney is suggested and an exploratory operation should be performed.

The action of other drugs has not yet been observed, but it is intended to investigate the effects of the belladonna-hyoscyamus group, eserine, adrenalin, morphine and other drugs.

Reports of Cases.

NARCOLEPSY.

By HASTINGS WILLIS, B.Sc., M.B., Ch.M. (Sydney),
Medical Officer, Repatriation Department, New South Wales.

IN this journal last year I recorded a case of narcolepsy, also a case of sleep attacks accompanied by Parkinsonism. A record of another even more typical case of this rare disease may be of interest.

C.65506, aged now thirty years, a returned soldier pensioned for effects of a gun shot wound of the left wrist sustained in the Great War, claims now to be suffering from "nervous trouble" which he describes in the following words: "I am unable to give vent to any emotion such as laughing or getting wild and I go to sleep anywhere and any time against my will several times a day and I have been affected that way for about six (6) years and gradually getting worse."

When interviewed, he explained that he cannot laugh when amused at a picture show, because when he commences to do so his jaw drops, his arms fall by his side, his eyes shut, his knees give way and he falls down "in a heap" unless he can put his arms around a post or lean on a table or similar object. After five or six seconds he regains control of himself and feels quite well. He insists that he never loses consciousness in such attacks and is quite aware of everything going on around him. Similar attacks have come upon him "dozens of times" when he has been annoyed by an opposition barracker at a football match and on several occasions when about to chastise his small boy. He dates the origin of these attacks of cataplexy back to April, 1922, the first twelve or eighteen being merely "weak feelings" which did not worry him to any extent. The first attack in which he actually fell down, occurred in September, 1922, on being told a funny story. In 1923 he fell from a cart in the streets of a busy Melbourne suburb as a result of one of these attacks brought on by laughing and lost his job as lorry driver because his employer assumed that he was drunk. Since he has come to recognize the relation of these attacks to emotion, he has minimized their frequency by avoiding picture shows and football matches, by changing his residence from Melbourne to a quiet New South Wales country town and has gained a degree of control over his emotions.

His sleep attacks commenced in February, 1923, the first occurring while eating his midday meal and continuing until he was awakened by his wife twenty minutes later. Though feeling flushed and uncomfortable, he was able straightway to go to his afternoon's work. During the remainder of 1923 these attacks occurred about once a day or once every second day, but they have gradually increased in frequency and now occur on an average three or four times a day. Without any apparent cause he feels sleepy and despite all efforts to prevent it, such as putting his head under a tap of cold water, running around the yard, wood chopping *et cetera*, gradually falls off to sleep. Whilst asleep, he often has dreams of various sorts, pleasant and unpleasant. One dream which he remembers because of its frequent recurrence he describes thus: "I seem to be walking along a road; then I think I am being chased by someone; then I seem to flap my arms and fly away." Often he has nightmares; one he remembers being described as "a feeling of a black cloud coming over me which gradually assumed the shape of a man and then a voice seemed to say: 'Beware of a thunder storm; there is danger in it for you'."

The duration of the sleep attacks varies from five minutes to three-quarters of an hour. If awakened he feels very annoyed and uncomfortable, but if allowed to awaken naturally, he feels quite well and equally refreshed if the duration of the attack has been short or long. He says he feels more refreshed after these attacks than after a night's rest.

On questioning him, I could obtain no history of any other variety of attack and his family history is clear of any suggestion of epilepsy. His manner and conversation were in no way suggestive of hysteria. He suffered from diphtheria, he says, when aged six years, but denies any febrile illness since his discharge from the Army. His army record shows that he suffered from influenza, apparently typical, in June, 1918, during the epidemic of that year amongst the troops in France. He is the fourth child and eldest boy of a family of five boys and five girls all of whom are alive and well, as also are his parents.

On physical examination he is of good physique, muscular and well nourished. His age is thirty years. His height is 157·5 centimetres (five feet three inches). His weight (coat and vest off) is 62·5 kilograms (nine stone thirteen pounds). No dental or pharyngeal sepsis was noted. No signs of organic nervous disease beyond an occasional muscular twitching was found. His heart showed no clinical or radiographical abnormality. His pulse rate at rest was 72 per minute and his exercise tolerance good. His systolic blood pressure lying at rest was 135 millimetres of mercury and his diastolic pressure 80 millimetres. An occasional rhonchus was heard on auscultation of his lungs, due apparently to a recent cold. An X ray film revealed no abnormality in his lungs and three sputum tests revealed no tubercle bacilli. His urine contained no albumin, no sugar and no microscopical deposits on ordinary clinical examination. His blood serum was submitted to a Wassermann test and a complement fixation test for gonococci was carried out; no reaction occurred in either instance. An X ray examination of the skull revealed no abnormality. A sugar tolerance test gave the following results: Fasting blood sugar, 81 milligrammes per 100 cubic centimetres; half an hour after ingestion of glucose, 118 milligrammes per 100 cubic centimetres; one hour after glucose, 133 milligrammes; one hour and a half, 110 milligrammes; two hours, 104 milligrammes. A faint trace of sugar was found in the urine before and after this test.

I had an opportunity of observing him in a sleep attack in the waiting room five minutes after I had examined him. His condition appeared to be one of ordinary sleep. He showed annoyance when I tried to awaken him. After ten minutes he awakened naturally and had an idea that someone had spoken to him during his sleep but he had no clear recollection of what had happened.

Mentally he is an intelligent and apparently normal man who told his story frankly and impressed me as a credible witness.

Comment.

That a practitioner not making pretentions to any special knowledge of neurology or psychiatry and whose patients are of necessity drawn from that relatively small number of men who enlisted in the Australian Imperial

Forces from New South Wales should have seen two patients with this until recently rare clinical condition within twelve months, together with the attention it has received in medical literature of Great Britain in recent years, suggests that narcolepsy is of more frequent occurrence now than formerly. One is tempted to relate this to the greater frequency of epidemic encephalitis in the last decade, especially when one remembers that narcolepsy has been observed as a temporary state after frank and unmistakable *encephalitis lethargica*[1] and the occasional association of sleep attacks with Parkinsonism, as in the case of C.65442 recorded by me in this journal last year.

It must be admitted that in this case there are no features which warrant an assumption that an ambulant attack of encephalitis was the cause of the condition, but that possibility cannot definitely be excluded.

In my experience of Parkinsonism a history of encephalitis is an exception. Occasionally, as in two patients under my notice in the last six months, it has been possible to obtain from the patient's family doctor notes of a febrile attack with transient diplopia which in the light of the later development of Parkinsonism must be regarded as being one of mild *encephalitis lethargica:* but in the majority of instances no history of anything suggesting encephalitis is obtained. The absence of a history of encephalitis, therefore, should not be taken to exclude the possibility of that disease being causally related to narcolepsy.

As regards the relation of narcolepsy to epilepsy, the distinguishing points mentioned by Adie[(1)] are present in this case, namely, the absence of unconsciousness in the cataplectic attacks, their reactivity to emotion, the non-appearance of any major manifestation of epilepsy, the absence of a family history of epilepsy and the absence of mental impairment. Collier[(2)] sees a close parallelism and a common pathology in these two diseases. Kinnier Wilson[(3)] regards narcolepsy as a variant of akinetic epilepsy. It may or may not serve a useful scientific purpose to include narcolepsy in that somewhat miscellaneous collection of disorders known as the epilepsies, but from the point of view of practical medicine I see grave objections to associating in any way narcolepsy, a condition which really impairs the patient's earning capacity much less than one would expect, with a group of diseases whose name epilepsy—whatever it may mean to the specialists[(3)]—implies to the general practitioner and to the public total and permanent impairment of earning capacity and a stigma akin to lunacy upon the patient's family and relations.

It will be noted that in this patient, as in the one whose history was recorded by me last year, the cataplectic attacks precede in date of onset the sleep attacks, whereas the contrary sequence is commonly regarded as the rule.

The pathology of the condition is unknown, but it is assumed that there is present a functional disturbance of the structures in the floor of the third ventricle of the brain. Such a disturbance may be secondary to an endocrine dyscrasia, as suggested by Collier[(2)] or may result from a subacute inflammation due to the virus of epidemic encephalitis. The results of investigation of this patient lend support to neither view.

Acknowledgements.

My acknowledgements are due to the Repatriation Commission for permission to publish these notes and to Dr. A. W. Campbell, Consulting Neurologist to the Department, for confirmation of the diagnosis.

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(1) W. J. Adie: "Idiopathic Narcolepsy: A Disease *sui generis* with Remarks on the Mechanism of Sleep," *Brain*, Volume XLIX, September, 1926.

(2) James Collier: Lumleian Lectures, 1928, reported in *The British Medical Journal*, March 31, 1928, page 558.

(3) S. A. Kinnier Wilson: "Epileptic Variants," *Journal of Neurology and Psychopathology*, January, 1928, pages 223 and 230.

RECOVERY IN BLACKWATER FEVER AFTER BLOOD TRANSFUSION.

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THE following case is of interest in view of the fact that recovery in a case of blackwater fever followed transfusion of blood. Manson-Bahr and Sayer[(1)] report a recent case in which the patient rapidly improved from a moribund to a conscious state after transfusion of 700 cubic centimetres of blood, but died three days later.

Mrs. M., aged thirty-four, had resided for some years in New Guinea, where she contracted malaria. On June 23, 1926, while visiting Melbourne, she had a mild rigor and thinking an attack of malaria was imminent, she took quinine 0·3 gramme (five grains) and some hours later 0·6 gramme (ten grains), but vomited almost immediately after the second dose. She then noticed that her urine was black. She was admitted to hospital the following day with a temperature of 38·9° C. (102° F.), a pulse rate of 116 and a respiratory rate of 24. She was sweating freely and complained of severe headache, backache and general weakness. The spleen was not palpable. Blood examination revealed a hæmoglobin value of 45%. Films manifested some poikilocytosis. No malarial parasites were present. The urine was black and contained much blood pigment but no red blood corpuscles. The patient was deeply jaundiced. The vomiting and nausea continued. On June 26, 1926, blood transfusion of six hundred cubic centimetres of citrated blood was performed. After two hours this was followed by a severe rigor and the pulse rate rose to 168. Five hours later the urine passed was much lighter in colour and within twenty-four hours was clear. The hæmoglobin content fell to 30% following the transfusion and then steadily rose, reaching 60% within a month of onset of the illness. The patient was discharged well on July 16, 1926, and has since returned to New Guinea.

Acknowledgement.

I am indebted to Dr. W. R. Boyd for permission to publish particulars of this case.

Reference.

(1) P. H. Manson-Bahr and E. G. Sayer: "Blackwater Fever in London: A Critical Study," *The Lancet*, February 5, 1927, page 273.

Reviews.

AN ANATOMICAL ATLAS.

"BAILLIÈRE'S SYNTHETIC ANATOMY" is an original and ingenious type of atlas, which consists of a series of drawings showing by means of superimposed, coloured, transparent plates, the soft tissues and structures *in situ*, as exposed by dissection, from the skin to the bone (or *vice versa*) both from the front and the back.[1] Part IX, the head and neck, which represents the latest addition to this atlas, is quite up to the standard of the earlier parts.

There is always a danger of relying too much on these ingenious aids to learning, but if it is recognized that the best place to learn anatomy is in the dissecting room, then atlases serve a useful purpose in supplying a record of actual dissection, and this one in particular ought to be quite useful for revision work when the student becomes accustomed to using it.

[1] "Baillière's Synthetic Anatomy," by J. E. Cheesman; Part IX: The Head and Neck. 1928. London: Baillière, Tindall and Cox. Crown 4to., pp. 12. Price: 2s. 6d. net.

The Medical Journal of Australia

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A Phase in Post-graduate Teaching.

THE announcement has been made from time to time in the columns of this journal of the forthcoming course of post-graduate lectures in Melbourne by Professor F. R. Fraser. In the present issue a further notice will be found concerning two lectures that will be delivered by Professor Fraser in Sydney. The visit to Australia by this distinguished physician is an event of moment.

A year ago the Melbourne Permanent Committee for Post-Graduate Work initiated the admirable practice of inviting prominent members of the medical profession in other countries to visit Australia and to give to the practitioners of the Commonwealth the advantages of their personal influence and of their particular views on those medical subjects to which they have given years of study. It will be remembered that Professor Allen Kanavel and Professor Charles Elliot, both of Chicago, delivered courses of lectures during the month of August, 1927. Both are recognized masters of their special branches of medical science. The views of Professor Kanavel on the surgery of the hand and of Professor Elliot on the diseases of metabolism are well known to all who read current medical literature. Neither lecturer included any new doctrines in his lectures and the diligent student attending the lectures was not told anything that had not been expressed in similar language in some article published in one or other medical journal. Some of the teaching of these two authorities has been adopted by the lecturers and clinicians in our own medical schools. The Melbourne Permanent Committee for Post-Graduate Work recognized that the important aspect of medical studies by graduates in practice is to be sought rather in the manner of the teaching than in the matter taught. It may be claimed that it is easier to gain a full grasp of an author's meaning from cold, printed words read at leisure in privacy. It is certain that an intelligent reader will cover much more ground in one hour in his library than will any lecturer, no matter how skilled. The view has been expressed on numerous occasions in this journal that the systematic lecture is a wasteful method of teaching students and that a competent teacher will impart more permanent knowledge to his student by demonstrations and informal talks, by impromptu clinical lectures and by asking questions than is possible in a series of set lectures. The systematic lecture may be satisfactory as an aid to the passing of examinations, although even for this purpose its value will depend on the interest the student takes both in the subject and in the lecturer. The somniferous effect of the lecture theatre is often intensified by the lack of ability of a lecturer to awaken enthusiasm in the members of his class. Post-graduate lectures, however, are quite different. In the first place they are delivered by men of unusual ability; the graduate comes to the lecture in a receptive state, ready to be fascinated and swayed by a personal influence that is new to him. The visitor recognizes that he can convince his audience by word and gesture. A writer is compelled to attack his subject under far less favourable conditions. The visiting lecturer is not required to be stereotype in his utterances; he is not bound by a syllabus nor by the prescribed fetish of an examining board. He is free to indulge in heterodox views, provided that he can substantiate them by evidence culled from his own experience and uphold them by logical argument. He has none of the disabilities of the lecturer addressing a class of students or of the author who foists his views uninvited on his contemporaries.

The visit of Professor Fraser may be regarded as the establishment of a precedent. The Melbourne Permanent Committee has been singularly happy in the selection of lecturers. Professor Fraser holds the important position of Director of the Medical Clinic at Saint Bartholomew's Hospital in London. The modern movement of medical and surgical units has revolutionized teaching in London and has given

birth to a living system of imparting information. His reputation as a clinician is unchallenged. It is anticipated that a large number of practitioners will avail themselves of the opportunity of listening to him and of absorbing all the intellectual food he will have to distribute. They will gain very largely both in practice and in theory. It must again be urged that the value of the messages he will deliver will depend more on the individuality he will impart to them than on their actual contents. In Melbourne he will speak on six occasions from August 7 and in Sydney he will give two lectures on August 28 and 29. It will be well if medical practitioners who can make arrangements to leave their work for a brief period, will join the course in Melbourne or in Sydney or even in both. The same opportunity will not present itself again for a long time.

Somewhat similar is the movement of inviting prominent members of the medical profession in the Commonwealth to deliver special memorial lectures under the auspices of one or two of the Branches of the British Medical Association. Professor W. Colin Mackenzie will deliver the Bancroft Memorial Lecture in Brisbane on August 3. The annual Listerian Oration inaugurated by the South Australian Branch is another instance of post-graduate teaching under favourable conditions by a lecturer who has gained eminence in one or other branch of medical study. On two occasions Adelaide scientists have been selected to deliver the oration. The organizers were wise in recognizing the merits of men in their own city and of doing honour to their own medical school. On other occasions the orators were selected from other schools. The plan of introducing a skilled lecturer who is personally unknown to the majority of those attending the lecture has widened the scope of post-graduate teaching and extended its power for good. It bids fair to become the most popular form and its attractiveness will be maintained as long as the selection is carried out with perspicacity and judgement. The number of medical orators in the English-speaking world is limited, but there are many highly-trained authorities in the several branches of the profession who have sufficient ability as lecturers to hold an audience at attention for an hour and whose personality is strong enough to lend an additional charm to their teaching.

Current Comment.

GASTRO-ENTEROSTOMY.

AT the discussion on the surgical aspect of gastric and duodenal ulcer reported in this issue, some of the speakers gave expression to views which show their bias to one special form of treatment. Discussions on the relative values of medical and surgical treatment in these conditions are by no means new; they are often futile. Collaboration or team work is hailed as the one means of solving all difficulties and of bringing about a gastric millennium. Unfortunately collaboration often begins and ends at the meeting at which it is mentioned. At the present time a certain amount of collaboration has been forced on both physicians and surgeons. In the present state of knowledge neither can afford to dispense with the services of the radiologist. The latter is required not merely for his photography, but for the value of his opinion. It would be strange if the opinion of a man who can count his radiological examinations of the stomach by the thousand, were not of value from a diagnostic and prognostic point of view. But if the radiologist is left out of the question, it must be recognized that there ought to be no attempt to elaborate distinct medical and surgical forms of treatment. The surgeon who excises a gastric ulcer and anastomoses the stomach with jejunum and who does not use medical treatment, gains his good results more by good luck than by anything else. In like manner the physician cannot always continue without invoking the aid of the surgeon. Many may say that statements of this nature are platitudes. That this is not the case is shown by a contribution recently made by T. Evan Jones.[1] He has made an analysis of a series of patients who were treated at New Lodge Clinic during the years 1921 to 1927, and whose surgical treatment yielded unsatisfactory results. The number of patients whom he investigated was fifty-five. That this number is extraordinarily high is seen from the fact that during the same period the total number of patients admitted to the clinic with gastric and duodenal ulcer was 159. Of these 32 suffered from gastric and 127 from duodenal ulcer. He divides these patients into three groups according to the condition from which they suffered after operation. There were thirty-six in the first group; these were found to be suffering from jejunal or gastro-jejunal ulcers. In the second group were four patients who were suffering from persistent or recurrent gastric or duodenal ulcers. Those in the third group who are described as suffering from other ill results or complications following gastro-jejunostomy, numbered fifteen. Of the patients in Group I thirteen had been relieved for between one and two years, nine had experienced relief for a few months only and eight had had no relief at all. Six had had more or less relief for periods longer than two years. Eight of the patients had been subjected to more than one operation before they were admitted to the clinic.

[1] *Guy's Hospital Reports*, April, 1928.

The periods of relief experienced by the four patients in Group II were variable. One had practically no relief, one was free from pain for a week, one had relief for a year and one was well for six years. Of the fifteen patients in Group III nine had no relief, five were relieved for a few months and one had relief for about two years. The majority of these patients complained of flatulence, of heaviness and distension after meals and of discomfort or pain in the lower part of the abdomen. Diarrhœa was common among those in whom a rapid "dumping" of the contents of the stomach into the jejunum occurred. In one patient the carbohydrate metabolism was disturbed. When there was some mechanical obstruction to the exit from the stomach or jejunum, epigastric pain or discomfort with nausea and vomiting was present.

It will be seen at once that these results are by no means creditable to those who had operated on the patients. This may be explained partly by the revelations made by Evan Jones in regard to the investigation before operation and the after treatment. All these persons were private patients and had been operated on "by some of the foremost surgeons in the country under the best possible conditions." It would be supposed from this that the patients had everything that was desirable both in investigation and treatment. It has been pointed out in this journal on several occasions that patients in public hospitals receive more thorough investigation into pathological conditions than private patients. The same evidently holds good of England. Only 20% of the patients in Group I had been subjected to X ray examination and only 17% had been treated medically with any semblance of thoroughness before operation. In no single instance had there been a complete investigation with X rays, test meal examination or examination of the stools for occult blood and no patient had received medical treatment for a sufficient length of time to allow the ulcer to heal. Treatment after operation was always inadequate and not one patient had received definite instruction as to what he should do to prevent recurrence of ulceration. No better example of one-sidedness in treatment of this kind could be found.

It must always be remembered that the surgical removal of an ulcer cannot in any sense be regarded as curing the patient. Surgeons may talk about curing a patient of ulcer after its removal, but as McKelvey has pointed out the removal of a comparatively large area of the stomach is a big price to pay for a small lesion, so small perhaps that it may be difficult to find on the mucosa. Removal of an ulcer by surgical means is really a confession of failure on the part of medical investigators to discover the true cause of ulcer. This statement does not imply that surgical operation should not be undertaken in these conditions, but it does indicate that the patient should be treated medically whether his ulcer is removed or not. Thorough investigation will often reveal conditions which may be regarded as having contributed to the ulceration and these must be removed. Even after removal of these causes and after excision of the ulcer the surgeon has only half done his duty if he fails to indicate to the patient how his future life should be conducted. It would perhaps be better if he placed the patient under the watchful eye of a physician who would instruct him to report at stated intervals. Collaboration of this sort is highly necessary.

RUPTURE OF THE HEART.

RUPTURE of the heart is not so rare an occurrence as might be supposed. In 1925 Krumbhaar and Crowell published an account of a study made by them on twenty-two unpublished cases of cardiac rupture and on 632 cases collected from the literature. At the same time, in the record of one thousand *post mortem* examinations conducted by Cleland in Adelaide there was no instance of cardiac rupture. The condition is worthy of study from the pathological aspect, though obviously treatment will be useless. Richard C. Buckley has recently reported three cases in which there were some interesting features.[1] The first patient was a male, aged thirty-five years, the second was a male, aged sixty years, and the third a woman, aged sixty-six years. The first patient suffered from generalized arterio-sclerosis with special involvement of the posterior tibial and *dorsalis pedis* arteries. The coronary arteries were affected and the right and left descending branches were occluded. The rupture occurred in the left ventricle. Infarction of the ventricular wall was found to be present. In the second case generalized arterio-sclerosis was also present, the coronary arteries being particularly involved. Rupture occurred in the ventricular wall. In the third instance the coronary arteries were also affected as part of generalized arterio-sclerosis. An infarct was found in the ventricular wall and it had been infected by an acute inflammatory process. Apparently no attempt was made to determine the nature of the infection although it is stated that its ætiology was not clear. The first and third patients had suffered from *diabetes mellitus*. These ruptures occurred through the ventricular wall and Buckley states that in Krumbhaar and Crowell's series the left ventricle was invariably the site. In *The British Medical Journal* of June 18, 1927, R. Llewelyn Hodges reported a spontaneous rupture through the right ventricle. There was no obvious reason discovered at autopsy why the rupture in this instance occurred on the right side. It is interesting to speculate as to the bearing of the diabetes on the condition. Undoubtedly the arterio-sclerosis was directly responsible, but presence of diabetes probably contributed to the weakening of the cardiac muscle. The presence of a small infarct would not necessarily make rupture inevitable; the diabetes, however, would make repair of the damages more difficult. The practical point which emerges from the consideration of this condition is the necessity for early recognition of arterial disease.

[1] *The American Journal of Pathology*, May, 1928.

Abstracts from Current Medical Literature.

MEDICINE.

Tuberculosis Amongst Young Women.

S. A. KNOPF (*The Journal of the American Medical Association*, February 18, 1928) has presented statistics apparently showing that the morbidity and mortality rates from tuberculosis are on the increase amongst the young women of the larger American cities. Recent figures prepared by the New York Tuberculosis and Health Association seem to prove that the death rate last year from tuberculosis was nearly twice as high amongst girls between the ages of sixteen and nineteen years as amongst boys. According to the observations of H. W. Green in Cleveland, the death rate for males and females between the ages of fifteen and twenty-five years was much the same up to the year 1918; but since that time the male death rate has shown a much more rapid decrease than the female and is now the lower. Between the years 1910 and 1926 the figures indicate that while the female death rate decreased by 14%, the male death rate manifested a reduction of 52%. It is considered that the female mortality is due in part to scanty dress of the modern girl, a garb which has the drawback of rendering the wearer more vulnerable to the attacks of the *Micrococcus catarrhalis* and the pneumococcus, and so providing in the lungs a suitable breeding ground for the tubercle bacillus. Many girls are given to the eating of scanty meals in order to preserve a youthful and slender figure and they avoid all foodstuffs which are thought to be fattening. The wearing of tightly-fitting *brassières*, intended further to increase the appearance of slim boyishness, is a danger in that it seriously limits respiratory movements. Late hours, insufficient sleep and the cigarette habit are further factors in adding to the tuberculosis risk amongst girls. Knopf considers that the perils due to dry and dusty air in offices and workrooms are very real. The room temperature, he thinks, should never exceed 20° C. (68° F.) and modern appliances for the collection of dust should be installed whenever the atmosphere is heavily laden with vegetable or mineral impurities. Systematic efforts are necessary to introduce a rational form of dress amongst young women. Deep breathing exercises and physical culture are of great value. Properly organized medical examinations are of the greatest importance if the problem is faced seriously and the offspring of tuberculous parents should receive special care and attention.

Significance of Low Arterial Pressures.

A. GRAHAM-STEWART (*The Practitioner*, February, 1928) after many observations extending over years of practice, states that persistent low blood pressure, unassociated with serious symptoms, for example, those of Addison's disease, of tuberculosis, of aortic regurgitation *et cetera*, is not of grave prognostic import. Patients with low blood pressure do not stand operations badly, but tolerate surgical procedures perfectly well. No preoperative medication will cause a rise in the blood pressure of such individuals. During operations no fall of pressure is to be observed and in general the operation may be performed with no larger element of peril than is to be feared with persons having a normal pressure. Chloroform would not appear to be specially contraindicated as an anæsthetic. In persons with low blood pressure arterial degenerations are not usual. A common complaint in such people is that of easily induced fatigue. Many of the subjects suffer from chronic intestinal stasis with pronounced colonic absorption. It would appear that in some instances depressor toxins are set free and that in yet others those of the pressor variety are liberated into the circulation. The state of low blood pressure is indicative of a general lowering of tone; it is a symptom merely of toxæmia and its treatment should be directed towards the discovery and removal of the source of the toxæmia. No good results can follow efforts intended only to raise the pressure, as by the use of strychnine, pituitary extract *et cetera*. These drugs are of value only in the absence of toxic factors. In young people the author considers that a persistently low blood pressure may act as a warning of the existence of a "pretuberculous state." A definite and lasting fall in the readings, occurring after operation in a patient in whom the figures were originally raised or normal, is the sure forecast of a fatal ending from vasomotor paresis.

A Case of Non-Tuberculous Hæmoptysis.

P. ÉMILE-WEIL AND R. GREGOIRE (*La Presse Médicale*, February 29, 1928) report a case in which large and repeated hæmoptysis occurred during a period of six months. The attacks were accompanied by severe cough, purulent expectoration, fever and loss of weight; the clinical features generally were those of a grave tuberculous infection of the lungs. But the absence of characteristic signs on auscultation of the chest, of tubercle bacilli from the sputum and of a more or less normal radiographic picture suggested the need for a new diagnosis. The patient was a man of thirty-one who for two years had complained of purpuric spots about his body and had had copious epistaxis. The coagulation time of his blood was much delayed and there was a definite history of bleeding amongst other members of his family. After consideration a splenectomy was performed and the operation resulted in a complete cure of the hæmoptysis, though a pathological examination of the removed organ revealed no abnormal feature. The diagnosis, easy because of the repeated hæmorrhages other than pulmonary and the history of hereditary predisposition, only shows that the whole problem may be one of difficulty in the absence of such criteria and may be settled only by repeated blood examinations.

Hyperpiesia.

A. H. DOUTHWAITE (*Guy's Hospital Reports*, January 7, 1928) records observations on forty-four patients suffering from hyperpiesia and on the results of treatment. The symptoms noted were dyspnœa in twenty-four patients, headache in nineteen, sometimes of a violent shooting type, giddiness in ten, hæmorrhages (nasal, retinal or cutaneous) in six, constipation, indigestion, fleeting pains in the limbs, mental confusion, depression, loss of memory, transient pareses and disorders of speech, drowsiness, angina, consciousness of the heart's action, choking sensations, visual disturbances, tinnitus and nervousness. Urinary symptoms such as frequency were uncommon except in late stages. Of the symptoms many were relieved by venesection, five hundred and sixty-eight cubic centimetres (one pint) or more of blood being removed. Tinnitus and consciousness of the heart's action were difficult to relieve. Fleeting pains in the limbs worse after exercise were possibly due to the increased tension in the vessels. Of the physical signs, a ringing aortic second sound was the commonest, a heaving apex beat was not always found. No relationship was found between diastolic pressure, absolute or relative to systolic pressure, and such symptoms as headache. Diastolic pressure was less liable to variations than systolic pressure. Evidence of nephritis was lacking in all cases and albuminuric retinitis was not observed. The blood cholesterol content was considerably higher in eight hyperpietics tested than in control normal patients, averaging one hundred and eighty milligrammes per hundred cubic centimetres of blood, as against one hundred and fifty milligrammes in normal persons. Eradication of septic foci caused no improvement in five cases; but acute infections were associated with a fall in blood pressure. Mental symptoms coincided with a definite fall in blood pressure in several instances and disappeared when the blood pressure again reached a high level, one hundred and eighty to two hundred milligrammes of mercury. In treatment rest in bed for a week or two may do good, but prolonged confinement did no good. Strenuous exertion, straining, stooping and exposure to cold were forbidden. A somewhat restricted and largely vegetable diet seemed to be helpful. The bowels were regulated by mild aperients and a weekly dose of calomel. Nitrites and iodides were disappointing. Bromides were useful for nervous symptoms. Thyreoid extract was invaluable when obesity and loss of the outer third of the eyebrows suggested hypothyreoidism. Morphine was useful for urgent symptoms. "Veratrone" 0·25 to one cubic centimetre given thrice daily by mouth, the tincture 1·2 to 1·8 mils (twenty to thirty

minims) and veratrine four milligrammes (one-sixteenth of a grain) in alcohol every four hours were found to have a definite effect in reducing blood pressure and relieving symptoms, but a small dose, gradually increased, was necessary if symptoms of collapse were to be avoided. Diathermy gave good temporary results. Venesection was the most valuable means of relieving symptoms, though it did not always cause much immediate or permanent diminution of the blood pressure. Venesection could be repeated every two or three months. Adrenalin one milligramme hypodermically, recently advocated by Lenaz, seemed to do harm. The cause of hyperpiesis was unknown; in some patients at the menopause an endocrine disorder was suggested; in other patients prolonged overfeeding, foul breath and constipation suggested the possibility of absorption of intestinal toxins.

Diagnosis and Treatment of Syphilis.

V. MUCHA (*Wiener Medizinische Wochenschrift*, April 21, 1928) discusses the diagnosis and treatment of syphilis. He emphasizes the importance of the detection of the spirochæte in all suspicious lesions either by staining methods or by dark ground illumination. The Giemsa stain can be employed for staining, although it may be difficult to see the spirochætes. He also recommends Fontana's silver stain and the crystal violet, tannic acid method of Risso. Treatment of syphilis is commenced with an injection of bismuth followed by "Neo-salvarsan" (0·45 gramme for women and 0·6 gramme for men). After an interval of one week another injection is given and for three weeks at intervals of four days "Neo-salvarsan" is given with bismuth twice a week. Three weeks are allowed to elapse and are followed by weekly injections of "Neo-salvarsan" and bi-weekly bismuth injections for at least ten weeks. The total course consists of six grammes of "Salvarsan" and twenty cubic centimetres of bismuth. After an interval of one month "Neo-salvarsan" is repeated at intervals for one year.

The Liver as the Organ of Sanguification.

J. D. ADAMSON (*Canadian Medical Association Journal*, February, 1928) points out that the genius of Galen led that master to infer that the liver, interposed between the digestive machinery and the heart, was the real factory of blood and that his views were espoused by Harvey. Modern medicine has now supported Galen to the full, though how the liver performs its function is not yet thoroughly determined. It is known, however, that by the maintenance of the blood sugar level, by the transformation of ammonia into urea, by the detoxication of certain substances formed in the digestive tract and by some subtle control of the metabolism of iron, the liver superintends the healthy metabolism of the body. It was shown in 1920 that exsanguinated dogs were able to regenerate blood when fed upon a diet of liver. That this experiment was not merely fortuitous is now proven. No patient with pernicious anæmia will fail to respond. This statement is borne out by the several hundred cases reported in the literature. According to Minot and Murphy the average rate of regeneration is about 300,000 red cells per week during the first two months of treatment, by which time the blood count is usually close to normal. As stated, the actual active principle determining the regeneration of blood is not known. Collip, at the University of Alberta, has produced what is probably the best known extract and patients who dislike offal, may thus avoid the distasteful process of eating from one-quarter to one-half a pound of whole liver each day. The iron, the protein and the fat soluble vitamins of the liver have all been credited with the specific effect, but since none of these bodies, given in other vehicles, has produced any favourable effects on the course of the anæmias in the past, some other active agent must be sought.

Lobar Pneumonia.

W. H. PARK AND G. COOPER (*The Journal of the American Medical Association*, April 28, 1928) report some results of the use of anti-pneumococcus serum in lobar pneumonia. Intravenous injection is most valuable, but if any doubt is felt as to the safety of this method, intramuscular injection may be tried; the latter is less useful on account of the slow absorption of the serum. Polyvalent sera are prepared by injecting killed cultures of pneumococci into the veins of horses. One unit is ten times the amount which protects mice from one hundred thousand minimal fatal doses of virulent pneumococci. Felton, at Harvard University, has used a method of precipitating the specific globulins with distilled water instead of ammonium sulphate. The serum so prepared is called refined serum and is less toxic and more concentrated than former sera. By injecting Types I, II and III pneumococci a polyvalent serum can be obtained of a strength of one thousand units for Type I, five hundred units for Type II and one hundred units for Type III. This serum is potent for Types I and II, but not for Type III. On admission to hospital each patient should receive 1,000 units of Type I and Type II antibody and as long as temperature is high or septicæmia is shown to exist, this dose should be repeated every eight to twelve hours. When the infecting organism has been typed, a monovalent serum should replace the polyvalent. If it is Type III or IV, injections should be stopped, as the antibody is too weak against these two to be of much use. If the temperature after falling should rise above 38·9° C. (102° F.) injections should be repeated. Slight joint pains, an urticarial rash or slight fever may result from the serum; in some cases chills result with doses of five to ten cubic centimetres, in others repeated doses of twenty cubic centimetres produce no disturbance. When pronounced bacteriæmia is evident, as in late severe cases, much larger doses are required than when the blood is sterile.

Tuberculous Pericarditis.

J. M. ALSTON (*Edinburgh Medical Journal*, March, 1928) reports tuberculous pericarditis as the sole tuberculous lesion in an old man. The patient, an old soldier, had enjoyed good health till he contracted influenza two months before admission to hospital, where he died in eighteen days with the symptoms and signs of cardiac failure. *Post mortem* a hæmorrhagic fibrinous exudate was found obliterating the pericardial sac. Microscopically a thick layer of tuberculous tissue was found on the visceral pericardium and acid-fast bacilli were demonstrated. No other naked-eye lesion of tuberculosis was present in any organ, but on microscopical examination caseation and giant cell formation were seen in a mediastinal gland; no acid-fast bacilli were found. It was noted that the lung failed to manifest even any pleural thickening or apical puckering. The author raises the question of the route whereby the pericardium became infected in this case and considers it to have been a secondary blood stream infection from a small lesion not discovered at autopsy. He offers two reasons: First, the adjacent tissues, including mediastinum and lungs, manifested no lesion except that in the mediastinal gland which was more recent than the pericarditis. Secondly, a blood-spread infection nearly always arises from a previously developed lesion within and not from without the body. From the appearance of the lesion its age was estimated at from six to twelve months and the influenzal attack was regarded as having enhanced its activity.

Auricular Flutter.

J. PARKINSON AND D. E. BEDFORD (*The Quarterly Journal of Medicine*, October, 1927) discuss the course and treatment of auricular flutter. Fifty-two patients were observed between 1913 and 1926; forty had established flutter and twelve paroxysmal flutter. Diagnosis was made by polygraph tracings and sometimes by electrocardiograms. The pulse rate was regular in thirty and irregular in twenty-two patients and the rate was between 90 and 170 per minute as a rule; in four patients it was 64 or less. Pressure on the vagi in the neck often slowed the pulse rate. Most patients were over forty years of age and generally some cardiac lesion existed as well as flutter; this affected the prognosis. The normal auricular rate was 250 to 300 per minute; in flutter there might be a one to one, two to one, three to one or four to one rhythm, that is, a ventricular rate of 300 down to 60. Normal rhythm returned after treatment and was maintained in twenty patients. Heart failure occurred in many and a change to auricular fibrillation in some. The latter was more favourable than flutter. Digitalis was the most useful drug, pushed to its

limits if necessary. Intravenous injections of strophanthin were often of temporary value in urgent cases. Quinidine often slowed the rate and in six cases was useful; doses of 0·3 to 2·4 grammes (five to forty grains) daily were used. If successful, the doses were reduced over a fortnight to 0·3 gramme (five grains) twice daily and this continued for some months. Prognosis was bad in those cases in which congestive heart failure came on early. Embolism is a danger when normal rhythm is restored, but this risk has to be taken, as a useful life is incompatible with auricular flutter. Rest is essential during treatment and generally violent exertion is to be avoided afterwards.

H. MOORE (*The Lancet*, April 21, 1928) discusses the ætiology and reports five cases of auricular flutter. This condition is closely allied to fibrillation and may change to fibrillation under treatment. Like fibrillation it is due to "circus movement" in the auricles, a continuous wave of contraction going round and round. The rate is usually about three hundred per minute. Flutter may be paroxysmal or persist for months or years. The ventricle generally does not respond to every auricular wave and commonly responds to every second wave, two to one block, the ventricular rate being about one hundred and fifty per minute. In the first case a man, aged sixty-nine, with a pulse rate of 108 to 120 was able to do light work after digitalis had been given in moderate doses, the pulse rate fell to 70 to 80. Digitalis (tincture) 1·2 to 1·8 mils (twenty to thirty minims) was given intermittently for four years; at the end of that time rhythm and rate became normal, as shown by electrocardiograph. In the second case a woman, aged forty-six, had a pulse rate of 216 when first seen; she died within two hours, treatment being of no avail. The electrocardiograph revealed a one to one response and auricular flutter. Two other men and one woman were studied, aged thirty-six, sixty and thirty years. In these three cases digitalis caused a change from flutter to fibrillation and then quinidine in small doses produced normal rhythm. Quinidine given before digitalis did no good. Recurrence of flutter in one case was observed several times and on each occasion digitalis and quinidine restored the normal rhythm.

Scarlatina.

H. SPARROW (*La Presse Médicale*, May 2, 1928) reports some results of preventive vaccination against scarlatina in Poland. In fourteen months of 1926 and 1927, 5,087 cases of scarlatina were notified in Poland. Several thousand children had been vaccinated before this epidemic, a total of 3,500 skin test doses of toxin (Dick vaccine) being given in three injections. In 1926, dead bacteria killed by formol were added (Gabryczewski's vaccine) and sometimes a fourth dose of 3,000 skin test doses was given. Since then the use of scarlatinal anatoxin has permitted enormous doses of antigen to be given, the equivalent of twenty to forty thousand skin test doses at one time. As a result the value of vaccination has been definitely improved. From October, 1925, to March, 1927, 23,657 children were examined by the Dick test, 55% were sensitive. Among these children 127 developed scarlatina, whereas only four who did not react to the test, were affected. That is to say the proportion of those regarded as susceptible who developed scarlatina, compared to those not susceptible to the Dick test who developed the disease, was thirty-two to one, a high degree of accuracy. Further, among thirty-five who did not react to the test and who were exposed directly for six weeks in a hospital, none contracted scarlatina. One hundred and sixty cases of scarlatina were observed among children vaccinated with toxin or with toxin *plus* dead bacteria. Those who had received 500 or 1,500 skin test doses formed the greater proportion of these patients, as compared with those who received 3,500 or more. There were also more cases among those vaccinated four to six months before than among those vaccinated twelve to eighteen months before; that is, resistance increased with each month after vaccination. Among 89,818 children who were not vaccinated, 1,158 cases of scarlatina occurred or 1·26%. Among the vaccinated the percentage was 0·43%. The vaccinated children had milder attacks and fewer complications. There were five deaths among the vaccinated children, four of whom had received the full dose of toxin. In Moscow a modified Gabryczewski vaccine (one million streptococci killed with formol and 600 to 1,200 skin test doses of toxin per cubic centimetre) was used, a total dose of one to two cubic centimetres being given to each person.

Tobacco Angina.

E. MOSCHOWITZ (*The Journal of the American Medical Association*, March 10, 1928) discusses the literature on and reports four cases of *angina pectoris* due to tobacco. Various authors have recorded bradycardia, tachycardia, extra systoles, auricular fibrillation and flutter in tobacco smokers. Tobacco smoke contains nicotine, collidine, aldehydes and carbon monoxide. Dixon has shown that the blood of smokers may contain as much as 5% carbon monoxide. Cigarettes, cigars and pipes have been each regarded as the most potent cause of symptoms by different observers. The histories recorded by the author are those of three men, aged forty-one, fifty-two and sixty-one respectively, and a woman, aged thirty-five. All had been fairly heavy smokers, eight to thirty cigarettes per day (Turkish) in two cases and twelve to eighteen Havana cigars per day in the others. Pain over the heart and down the left arm was felt in all cases, it was generally severe and prolonged and in one instance was unrelieved by morphine. The pain usually came on at rest, but in one patient in whom the heart was enlarged, pain occurred after exercise also. In the other three patients no evidence of heart or aortic disease was noted clinically, radiologically or with the electrocardiograph. In all cases the pain ceased within seven to twelve weeks after smoking was stopped. In one instance they recurred when smoking was again indulged in and ceased on abstinence from tobacco. In no case was any pallor or other change in colour noted, nor was the pulse abnormal during the attacks of pain. The patient manifested cardiac enlargement and the tobacco may have aggravated or induced true angina here, but pain ceased, at any rate temporarily, when tobacco was withdrawn. The nature of tobacco angina is uncertain, arterial spasm is suggested as a possible cause; it may be that tobacco merely induces angina in susceptible subjects. In treatment absolute withdrawal of tobacco is essential.

Treatment of Uncomplicated Gonorrhœa.

R. O. STEIN (*Wiener Medizinische Wochenschrift*, April 28, 1928) refers in the first place to the abortive treatment of gonorrhœa in the male. A solution composed of five cubic centimetres of a 5% solution of cocaine in equal parts of distilled water is mixed with five cubic centimetres of a 10% solution of any silver preparation. The *glans* and prepuce having been disinfected with a 5% solution of silver nitrate, the anterior part of the urethra is filled with the above solution which is retained for ten minutes. This is followed by an injection of 10% silver solution for ten to fifteen minutes. An intramuscular injection of extra strong "Arthrigon" (0·5 cubic centimetre) is given. The instillation is repeated in five hours and also on the following morning. Even if no gonococci be found, it is better to repeat irrigation with weaker solutions on the second evening and third morning. "Arthrigon," one cubic centimetre, is now injected and repeated on the seventh and ninth days. Active treatment of a patient with gonorrhœa should not be commenced in the presence of phimosis with definite inflammation, if there be severe local reaction associated with hæmorrhage or in the presence of chordee. As a rule injections can be commenced at once. The patient must be instructed how to use a syringe. The injections are ordered every four hours and the patient is instructed to retain the drug for one minute at first and later up to five minutes. The author recommends protargol in progressive strengths from 0·5 to 2·0 grammes in 200 cubic centimetres; "Argonin" (silver caseinate) of similar strength or "Choleval" (a colloidal silver preparation) 0·4 to 1·0 gramme. Astringent preparations are not used at first and require careful supervision. Sandalwood oil is given by mouth, not as an antiseptic, but for the relief of subjective symptoms such as painful micturition. Chordee is treated by bromides alone or in

combination with other sedatives. Atropine sulphate, 0·0005 to 0·001 gramme in the form of a pill, has proved of use to prevent the tonic contraction of the *muscularis mucosæ* which not only causes pain, but tends to spread infection backwards. When infection of the posterior part of the urethra occurs, belladonna suppositories will relieve any dysuria. Urotropin in combination with salicylates should be given. Potassium permanganate (one in four thousand) is used for irrigations followed by instillations of a 5% to 10% solution of protargol. In the treatment of posterior infections endoscopy plays an important part, but this treatment requires expert knowledge and should not be undertaken lightly.

Malarial Treatment of Neuro-Syphilis.

J. WAGNER JAUREGG (*Wiener Medizinische Wochenschrift*, February 28, 1928) discusses the advantages of the malarial treatment of *tabes dorsalis* and general paralysis of the insane. He maintains that 83% of his patients with paralysis have been relieved by this treatment. The onset of paralysis is to be feared in all patients whose cerebro-spinal fluid reacts to the Wassermann test. Such patients should be treated with malaria followed by "Neo-salvarsan" and in the majority of cases the response of the serum will change. Tabes is a disease of longer duration and frequently remains stationary over long periods. The author considers that in such cases antispecific treatment is to be preferred. If the serum response be positive, then the malarial treatment should be undertaken. Blood from a patient with tertian malaria is injected intravenously or subcutaneously. The exact amount injected is immaterial, nor need it be taken during a rigor. After an incubation period of one to two weeks the patient commences to have rigors. The type of fever is usually tertian, but in some cases may become quotidian. Cardiac stimulants are required during this stage. Quinine by mouth, five grammes during five to seven days, is used to stop the malaria. These patients react better to quinine than do those with pure malarial infections and the author has never seen a recurrence. The patients feel better, increase in weight and eat and sleep well. At first the Wassermann reaction may be intensified, but after the quinine it does not occur and often remains absent for several years. In elderly persons or those in poor health it is better to allow only two to four rigors and then to stop them with quinine. This is followed by six weeks' treatment with "Neo-salvarsan." A second injection is then made and four to six rigors allowed. In some cases the cure is taken in one sitting, but the rigors are controlled by small doses of quinine. The author considers that the malaria injection works in two ways: an action similar to that following protein injection as well as a direct action on nerve fibres and the surrounding connective tissue.

The Treatment of Acute Infections.

M. STERNBERG (*Wiener Medizinische Wochenschrift*, March 17, 1928) considers that "Acriflavin" and emetine are of considerable value in the treatment of various acute infections. "Acriflavin" is administered in doses of 0·01 gramme per kilogram of body weight. For adults this varies from 0·5 to 1·0 gramme for each injection. The drug is dissolved in twenty cubic centimetres filtered and sterilized distilled water and is prepared fresh for each injection. When there is difficulty in finding a vein, a rectal injection may be given. This consists of "Acriflavin," tincture of opium ten to twenty drops and mucilage of gum arabic; the total enema given is seventy cubic centimetres. The action is, however, weaker and less effective than when given intravenously. The main indications are articular rheumatism and endocarditis. Pain and fever are rapidly relieved. Vomiting frequently occurs as well as loss of appetite for one or two days. The author advises care in its use for severe septic infections because of the risk of death following vomiting. No renal complications were observed. Emetine has been used successfully in pulmonary suppuration. A watery solution is given subcutaneously. If administered by mouth, it causes vomiting, while severe toxic symptoms may follow the intravenous injection. It is important to remember that it has a cumulative action and is only slowly excreted from the body. The author prefers to give it in association with "Acriflavin" and "Neo-salvarsan." A 5% solution of emetine hydrochloride is used; 0·05 gramme is given daily for ten days, followed by an interval of one to three weeks during which one injection of "Acriflavin" or "Neo-salvarsan" is administered. The sputum rapidly decreases in amount and becomes odourless, the temperature falls and the patient rapidly improves in general health. The radiological examination of the chest reveals reduction in the size of the cavities present.

Agranulocytic Angina.

L. K. GUNDRUM (*Archives of Internal Medicine*, March 15, 1928) reports a case of agranulocytic angina. Forty-six cases of this condition have previously been recorded. It is characterized by an acute onset with a temperature of from 38·3° to 40·5° C. (101° to 105° F.) with great prostration, sore throat, sore mouth and severe headache. It is sometimes accompanied by rigors, general muscle pains, vomiting, herpes, bleeding from the oral and vaginal mucosa and jaundice. A membrane is usually present either in the region of the tonsils or along the gingival margins. In fatal cases the external genitalia are often involved and may become the site of deep ulceration. Glandular involvement as a rule is not pronounced. Examination of the blood reveals a considerable reduction in the number of the granular leucocytes. *Bacillus pyocyaneus* has been isolated in a number of instances and in none of these has recovery taken place. The bone marrow has sometimes been found to be poor in cells and the spleen enlarged at autopsy. The patient described by the author was a woman, aged fifty-eight years, who became ill on February 1, 1927. The illness was typical of agranulocytic angina and recovery occurred, to be followed almost immediately by a second similar attack. When the author first saw her at the end of July, 1927, she was suffering from her third illness of the same nature. A few small rose-coloured herpetic areas were present on the wrists. The tonsils were slightly enlarged and red. Some swelling was present behind the right tonsil, but there was no evidence of fluctuation and neither exudate nor membrane was present. The temperature rose to 39·5° C. (103·2° F.). The spleen was enlarged; the heart and lungs were normal. The throat became filled with stringy muco-pus and some greyish patches, easily removable, were present on the pharynx. Fever continued, the heart's action became irregular, the patient became comatose and died. On examination of the blood it was found that the leucocytes numbered 660 per cubic millimetre; 82·5% of these were lymphocytes and 16% polymorphonuclear cells. Neither *Bacillus diphtheriæ*, Vincent's bacillus, nor *Bacillus pyocyaneus* was found. No growth resulted from blood culture. At autopsy the bone marrow was found to be normal. The author points out that the unusual features were the history of two previous attacks, the extremely low leucocyte count and the fact that the viscera and bone marrow appeared to be normal. He believes that this condition has been overlooked in the past and that it is more common than would appear from the number of cases reported. The diagnosis can be made with certainty only by examination of the blood.

The Intradermal Salt Solution Test in Tuberculosis.

AARON FELDMAN (*Archives of Internal Medicine*, April 15, 1928) has investigated the intradermal salt solution test in tuberculosis. McClure and Aldrich found that the elevation produced by the injection of salt solution disappeared more quickly than normally in the presence of œdema or in the prœdematous state. The author has used the test on twenty-nine patients who suffered from tuberculosis of varying degrees of severity. In twenty-four of the patients the disappearance time of the elevation caused by the injection fell below the lower limit of normal. The shortest times were obtained in patients who manifested toxic symptoms. That pulmonary tuberculosis does not always cause a short disappearance time is shown by the fact that in five the time was considerably prolonged. Four of these died soon after the test was performed. The author thinks that it is necessary to consider the possibility that secondary infection may play an important part in the short disappearance time in tuberculous patients.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION in conjunction with the Section of Surgery and the Section of Radiology was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on April 26, 1928, DR. J. E. V. BARLING, the President, in the chair.

Diseases of the Stomach and Duodenum.

DR. J. L. MCKELVEY said that in a discussion on the surgery of the stomach and duodenum three main conditions had to be considered. They were gastric ulcer, duodenal ulcer and carcinoma. The literature about ulcers of the foregut was so voluminous and such contradictory views were expressed by authorities with wide experience in these conditions that doubt was engendered as to the most appropriate treatment. When in 1881 Wölfer, acting on the suggestion of his assistant Nicoladani, had performed the first gastro-enterostomy he could hardly have been aware of the flood of benign and mischievous surgery which he was letting loose on the stomach. In the presence of definite pyloric obstruction benefit followed often rapidly and dramatically, but when the operation was used for every form of dyspepsia, disasters were the result. It had been some time before the faults of technique were mastered. The early operations of the anterior type, the posterior operation with long afferent loops, the diminutive and badly placed openings, the unabsorbable sutures had each manifested its own defect after long experience of failure. Even when the technique had seemed to be perfect in every detail, there had still persisted some doubt as to the correct position of the opening and the tendency in recent times had been to place it further from the pylorus.

There were and probably would remain two schools of thought as to the basic principles of treatment of gastric and duodenal ulcer, the medical and the surgical. By the former was meant that large volume of opinion which did not favour surgical measures, but relied on dietetic and medicinal means. The perusal of the results obtained by these methods might almost convince a surgeon of their efficacy. Among those who favoured operative procedures, there was much diversity of opinion as to the correct or necessary form of operation. In the case of duodenal ulcer it was found that men of the highest surgical scholarship, such as Sherren, favoured a simple gastro-enterostomy, while on the other hand surgeons of equal and of international reputation condemned this as inadequate and suggested excision of the ulcer in addition. In recent years there had been a tendency to more heroic measures such as excision or even pylorectomy with removal of the acid hormone-secreting area. This seemed to be a heavy penalty to pay for a lesion of the duodenum which was not so large as a threepenny piece and which was often a mere fissure of the mucosa. Whatever was the method adopted, some form of short circuiting was the common factor in all. How this acted, whether mechanically by diverting the food stream or chemically by allowing some regurgitation of alkaline matter from the jejunum, was not agreed upon. Probably both influences were at work. Many and varied operations for joining the stomach and duodenum had been tried. Most of them were kept alive in surgical literature only by the glamour of the author's name; such operations were those of Jaboulay, Kümmell, Villard, Kocher and Finney.

It was the rule that when the choice lay with the surgeon, he would do a posterior gastro-jejunostomy the details of which were described elaborately in all books on operative surgery. But a short time previously it had been considered correct to have the intestine and stomach isoperistaltic and Dr. McKelvey had a painful memory of being taken to task in an examination by a beloved master, since passed away, for omitting to mention this point. However, equally good results followed the contraperistaltic methods. Moynihan whose aptitude for phrase coining had made him the Birkenhead of the medical profession, performed the anastomosis with a vertical or neutral opening. Many surgeons still used unabsorbable material for the sutures, though the general tendency was to rely on catgut. It was of grave importance to have no loop between the duodeno-jejunal flexure and the opening. The removal of the exuberant intestinal mucosa did not seem necessary nor did the use of clamps. The opening should be at least five centimetres (two inches) long.

After the performance of a gastro-enterostomy certain grave complications might appear. One of the most distressing was the ulcer at the margin of the new opening, a new lamp for old. This might be a greater instrument of torture than the original condition. It might perforate acutely or chronically; in the former case with the clinical picture of an ordinary gastric or duodenal rupture, in the latter with the persistent agony of an adherent ulcer. When the ulcers became attached to the colon and perforated into it, the patient in addition to the stress of his pain had the shame of fæculent eructations. The blame for such ulcers had been laid at the door of the unabsorbable stitch, but they might occur independently of this and even on the jejunum inches away from the anastomosis. Perhaps in such patients the intestinal mucosa was peculiarly susceptible to the acid chyme and prolonged alkalinization of the stomach contents after the operation might prevent this formation.

In the surgical treatment the surgeon encountered grave difficulties. The proximity of the middle colic artery to the ulcer, often forming as it did one boundary of the lesion, the shortness of the afferent loop and the adhesions made the excision of such an ulcer very difficult. If the original duodenal ulcer was healed, Dr. McKelvey excised the ulcer close to the stomach and anastomosed the intestine, leaving the stomach in its normal condition; he then treated the patient with appropriate diet and alkalis. Hæmorrhage after a short circuiting operation was a complication both alarming and puzzling, for its source was difficult to determine. After the operation it might come from the suture line or from the ulcer, but there had been cases in which it recurred after excision of the ulcer and closure of the pylorus, and even in those in whom a pylorectomy had been done. The bilious vomiting or vicious circle was due to faulty technique. There was a long afferent loop, the opening had been badly placed or there was some obstruction to the efferent loop either by hernia of the bowel into the lesser sac or from adhesions. In the treatment of gastric ulcer the tendency was towards more radical methods. It was no longer considered sufficient to rely on a gastro-enterostomy. Excision of the ulcer by knife or cautery, combined with gastro-enterostomy or partial gastrectomy gave good results. Hour glass stomach, a common sequel of lesser curvature ulcers, had had much surgical technique devised for its treatment. Gastro-gastrostomy, union between the proximal pouch and the jejunum, excision of the distal pouch, sleeve resection had all been performed. The last was an unsatisfactory operation, for the condition often recurred.

Carcinoma of the stomach was a dreadful disease and in spite of the improved methods of diagnosis was so advanced in many cases, when the patient reached the surgeon, that little could be done. Consequently the ultimate results were not satisfactory. A choice of several operations, such as Billroth I, Billroth II, Pólya *et cetera*, were left to the surgeon. The basic difference lay in the method of anastomosis of the stomach and intestines. This was but a trifle when compared with the necessity of removal of sufficient stomach and gland-bearing tissue.

DR. H. R. SEAR gave a demonstration of the radiological appearances in the ulcer of the stomach and of the duodenum and other affections of these organs. He displayed a large number of skiagrams on the screen. In the first place he exhibited tables to call attention to the relation of hunger pain to gastric and duodenal disorders. Arguing from his own experience of the last five thousand patients sent to him for X ray examination on account of symptoms pointing to some affection of the stomach or duodenum, he found that duodenal ulcer was nearly four times as common as gastric ulcer and that the frequency of juxta-pyloric ulcer and that of true gastric ulcer was approximately equal. Hunger pain occurred in approximately 20% of those patients who were found

to have gastric ulcers. On the other hand hunger pain appeared in about 85% of those with duodenal ulcer. In only about 50% of patients with hunger pain was duodenal ulceration found. Vomiting, too, was relatively infrequent in gastric ulcer and the same was true in regard to hæmorrhage. He demonstrated that gastric carcinoma was less common than was usually supposed, only averaging one in twenty-five of the patients examined in this series. Dr. Sear explained the several abnormalities in the skiagrams in connexion with gastric and duodenal ulcer, carcinoma of the stomach, diverticulum of the duodenum and pancreatic lesions *et cetera*. It is impossible in this place to reproduce the large series of skiagrams used in this demonstration.

DR. P. S. PARKINSON read a paper entitled: "The Radiological Aspect of Diseases of the Stomach and Duodenum" (see page 114). The paper was illustrated by means of skiagrams projected by the balopticon.

DR. W. B. DIGHT expressed his pleasure in having listened to the remarks of the three speakers and in having seen the admirable pictures thrown on the screen by Dr. Sear and Dr. Parkinson. He was interested to hear the latter speak of the gaping pylorus in the early stages of malignant disease of the stomach. In his own experience, more particularly at Randwick Hospital, he had contented himself with a single test meal. He had followed the stages of the meal and had obtained all the information he had sought by watching the progress of the one test meal. In only a small percentage of cases had he considered it advisable to give a second (fluid) meal; this was given on the second morning after a careful examination of the large bowel and appendix.

DR. ARCHIE ASPINALL congratulated Dr. McKelvey on his paper and pointed out the difficulty in diagnosing ruptured ulcer if the patient was seen after the initial shock had passed off. At times it was very difficult for the radiologist to demonstrate an ulcer. Recently he had performed a partial gastrectomy on a patient who had had several hæmorrhages and a laparotomy performed without result. Several X ray examinations had been made and after several years X rays had revealed an extensive ulcer which at operation was found to be malignant and eroding the pancreas. Dr. Blackburn had given him his notes of the case and he intended to submit the history of the case to the Editor of the journal for publication at a later date. Another patient had been operated on by Dr. McKelvey and appendicectomy performed after the stomach had been unsuccessfully palpated for ulcer. Three years later a large ulcer, not malignant, had been found at operation; the ulcer had eroded the pancreas. These two cases showed the difficulty of early diagnosis in some instances.

DR. H. S. STACY spoke of hunger pain in conditions other than duodenal ulcer. None of the speakers had dealt with the pathology of the conditions. If the pain were due to increased tension from the excessive contraction of portions of the gastric musculature (which in turn were often caused reflexly from the appendix, colon and gall bladder) then it would be understood how closely the pain of duodenal and gastric ulcer might be simulated, for it was muscular spasm that caused the pain in these latter conditions, not the passage of the gastric contents over the ulcerated surface. In regard to the fact that duodenal ulcer was commoner in males and gastric ulcer in females, he had formed the opinion that this difference was in some way associated with the type of stock inherited. The hypertonic type was commoner in males and the hypotonic stomach was commoner in females. In the hypertonic type the unneutralized gastric contents entered the duodenum without difficulty. In the hypotonic form the acid gastric contents were more or less retained. He agreed with Dr. McKelvey that it was advisable not to be very radical in the operative treatment of gastric ulcer. In 90% of patients with gastric ulcer posterior gastro-enterostomy together with the removal of the appendix and any other source of infection, the best results were obtained. He had often felt sorry that he had attempted too much. A partial gastrectomy was sometimes necessary.

DR. H. BULLOCK pleaded for the ideal—collaboration, not competition with the physician—which was seen under admirable conditions at the Mayo Clinic. It was the custom there to operate on every patient with gastric ulcer, whereas only 70% of those with duodenal ulcers were operated upon. It was his opinion that destruction of the ulcer by some means such as by sewing, cautery or excision was essential to success. His experience was that his results had been very good when he had adopted radical measures—pylorectomy for duodenal ulcer and gastrectomy (partial) for gastric ulcer—and not so good when he had performed gastro-enterostomy for duodenal ulcer and excision of the ulcer and gastro-enterostomy for gastric ulcer. In view of the opinions held by the pathologists, McCarthy of the Mayo Clinic and by Stewart of Leeds, of the close association between gastric ulcer and carcinoma, he considered medical treatment of gastric ulcer reprehensible. As far as diagnosis was concerned, from an experience of many cases he held that X rays were the only means by which definite diagnosis could be made. In the hands of a competent surgeon he considered that operation held out the opportunity of immediate relief from symptoms and cure and return to work in a short space of time which medical treatment could never do.

In his reply Dr. McKelvey said that in the diagnosis of acute perforation of the stomach or duodenum two factors were of paramount importance, namely the sudden pain and the abdominal rigidity. The rigidity usually was so great that the abdominal muscles were like a metal plate. Even the diaphragm might be involved in the rigidity so that the patient breathed in gasps. The pulse gave no indication in the early stages when operation offered an excellent chance of recovery. The pulse was often normal in rate and of good quality when the patient's intestines were bathed in duodenal contents. In many cases the appendix was looked upon as the offending organ, especially in those cases in which the first gush of infecting material spread down the ascending colon to the caecum. In these the appendix was found covered in lymph and looked as if it had been dipped in cream. As regards a "cure" after operations for stomach and duodenal ulcers he said there was a number of patients whose long history of pain-varying treatment, analysis of stomach contents, X rays *et cetera* had taught them they had a stomach. In these even after operation and healing of the ulcer, there was a watchful expectation after every meal so that a gastric neurosis, post-operative or otherwise, was a real thing. Such patients would be always with them. Concerning the causal relationship between chronic ulcers and gastric cancer he expressed himself with caution, referring to Osler's monograph on cancer of the stomach in which the analysed statistics showed that most patients with cancer of the stomach had not a long history suggestive of chronic ulcer. Even the most experienced could err in the recognition of isolated cells as cancer cells. He referred to Sampson Handley's statement that groups of cancer cells could be recognized in the bowel wall 20 to 22·5 centimetres (eight to nine inches) above a cancer of the rectum and to Paget's interpretation of the enlarged Peyer's patches in the small intestine in the Napoleonic relics.

Dr. Sear in his reply pointed out to Dr. Bullock that the surgeon usually saw only those patients in whom gastro-enterostomy had been satisfactory. When gastro-enterostomy had not been satisfactory, the patient usually did not return to the surgeon, but consulted a physician. Dr. Sear also said that in this series of cases while duodenal ulcer was found in approximately 550, the patients who presented themselves for X ray examination because of the unsatisfactory nature of their gastro-enterostomy numbered well over one hundred. It had not been his experience that the surgeon referred gastro-enterostomy patients to the radiographer soon after operation.

In reply to Dr. Stacy he said that the inherited type of stomach did not altogether explain the facts, as it had been shown that duodenal ulcer was on the rapid increase in women, while the type of stomach would not have changed to that degree.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Abdullah, Anthony Dominic, M.B., Ch.M., 1926 (Univ. Sydney), 267, Oxford Street, Darlinghurst.

George, Noel Francis, M.B., B.S., 1928 (Univ. Sydney), Koorawatha.
Ginsberg, Maurice William, M.B., B.S., 1927 (Univ. Sydney), Sydney Hospital, Sydney.
Lumley, George Frederick, M.B., Ch.M., 1926 (Univ. Sydney), 70, Bestic Street, Rockdale.
Stevens, Stanley Gordon, M.B., B.S., 1928 (Univ. Sydney), Mental Hospital, Orange.

Post-Graduate Work.

SPECIAL LECTURES IN SYDNEY.

THE Council of the New South Wales Branch of the British Medical Association has made arrangements with Professor F. R. Fraser to deliver two lectures in the library of the B.M.A. Building, 30 to 34, Elizabeth Street, Sydney, on August 28 and 29, 1928, at 8.15 p.m. The subjects will be the causes of dyspnœa and the clinical types, with special reference to asthma and heart failure and its treatment. The lectures will be open to members of the New South Wales Branch of the British Medical Association on the payment of a fee of one guinea.

THE REFRESHER COURSE IN MELBOURNE.

THE Melbourne Permanent Committee for Post-graduate Work announces that a limited number of participants of the annual post-graduate course can be accommodated at the Alfred Hospital, the Melbourne Hospital and the Saint Vincent's Hospital. A charge of three guineas a week for board will be made. Applications should be made before July 31 for accommodation to the Honorary Secretaries.

SYLLABUS.

The following time table has been issued.

Monday, August 6, 1928.

11.15 a.m.—Dr. K. Hiller: Demonstrations in the medical wards of the Melbourne Hospital.
Dr. B. T. Zwar: "Surgery of Empyema," at the Melbourne Hospital.
2.15 p.m.—Demonstrations at the Walter and Eliza Hall Institute of Research in Pathology and Medicine:
Dr. N. H. Fairley: "Methods of Investigating the Dentition of Venomous Snakes."
Dr. C. H. Kellaway: "Some of the Effects Produced by Snake Venoms."
Dr. F. M. Burnet: "Bacteriophage, its Significance in Bacterial Infections."
Dr. N. H. Fairley: "Recent Advances in Knowledge Concerning the Treatment of Snake Bite."
Dr. R. J. Wright Smith: "Tumours of Bone," "Brain Tumours."

Tuesday, August 7, 1928.

9.30 a.m.—Dr. J. Bell: "Some Aspects of Gastric Ulcer," at the Alfred Hospital.
Dr. R. C. Brown: Demonstrations in the surgical wards of the Alfred Hospital.
11.15 a.m.—Dr. J. Major: "Personal Experiences in Treatment," at the Alfred Hospital.
Dr. Fay Maclure: "Fractures," at the Alfred Hospital.
2.15 p.m.—Dr. R. Fowler: "Obstruction of the Oviducts, Investigation and Treatment," at the Alfred Hospital.
Dr. S. Shields: "Common Skin Conditions," at the Alfred Hospital.

Wednesday, August 8, 1928.

9.30 a.m.—Dr. A. Wilson: "The Value of Version in Obstetrics," at the Women's Hospital.
11.15 a.m.—Dr. J. S. Green: "Ante-natal Difficulties," at the Women's Hospital.
2.15 p.m.—Dr. F. Scholes: "Infectious Diseases," at the Infectious Diseases Hospital.

Thursday, August 9, 1928.

9.30 a.m.—Dr. M. D. Silberberg: Demonstrations of patients with medical and cardiac conditions, at the Alfred Hospital.
Dr. Balcombe Quick: "Rectal Ailments," at the Alfred Hospital.
11.15 a.m.—Dr. J. F. Mackeddie: "Lipiodol in General Practice," at the Alfred Hospital.
Dr. A. J. Trinca: "Local Anæsthesia," at the Alfred Hospital.
2.15 p.m.—Demonstrations at the Baker Institute:
Dr. A. B. Corkill: "Bacteriology and Cytology of the Cerebro-spinal Fluid."
Mr. Doutch: "The Meaning of Hydrogen Ion Concentration; Modern Methods of Estimating Reactions."
Dr. J. Fiddes: "The Action of Drugs on the Heart," kymographic demonstration.
Dr. J. F. Mackeddie and Dr. L. Stokes: "Electrocardiographic results."
Dr. I. J. McLean: "Mononuclear Cells of the Blood."
Dr. W. J. Penfold: "Technique and Significance of Blood Grouping."
Dr. T. A. Travers: "Biochemical Examination of the Cerebro-spinal Fluid."
Dr. A. J. Trinca: "Early Diagnosis of Malignant Disease of the Breast."

Friday, August 10, 1928.

9.30 a.m.—Dr. S. O. Cowen: "Lesions Under the Right Diaphragm," at the Melbourne Hospital.
Dr. Alan Hailes: "Fracture of the Femur," at the Melbourne Hospital.
11.15 a.m.—Dr. Hume Turnbull: "Cardiac Infarction," at the Melbourne Hospital.
Dr. Harold Dew: "Cancer of the Mouth and Throat," at the Melbourne Hospital.
2.15 p.m.—Dr. S. Ferguson: "Diet and Diarrhœa," at the Children's Hospital.
3.30 p.m.—Dr. R. Downes: "Bone and Joint Surgery in Children," at the Children's Hospital.

Saturday, August 11, 1928.

9.30 a.m.—Dr. Ivan Maxwell: "Paroxysmal Rhinorrhœa, Fractional Test Meals in Asthma," at the Melbourne Hospital.
Dr. C. H. Searby: "Treatment of Head Injuries," at the Melbourne Hospital.

Monday, August 13, 1928.

9.30 a.m.—Dr. J. Grieve: Demonstrations of patients with cardiac affections at the Saint Vincent's Hospital.
Dr. Murray Morton: "Routine Surgical Cases," at the Saint Vincent's Hospital.
11.15 a.m.—Dr. W. J. Newing: "Diagnosis and Treatment of Diseases of the Respiratory System," at the Saint Vincent's Hospital.
Dr. J. Newman Morris: "Varicose Veins, Modern Methods of Treatment," at the Saint Vincent's Hospital.
2.15 p.m.—Dr. R. Hennessey: "Acute Inflammatory Conditions of the Ear," at the Saint Vincent's Hospital.
Dr. J. Whitaker: Demonstrations of patients in the surgical wards at the Saint Vincent's Hospital.
Dr. A. N. McArthur: "Treatment of Diseases of the Female Genitalia and Morbid Pelvic Conditions," at the Saint Vincent's Hospital.

Tuesday, August 14, 1928.

9.30 a.m.—Dr. F. B. Lawton: Demonstrations of patients in the wards of the Melbourne Hospital.
Dr. A. Coates: "Treatment of Acute Abdomen," at the Melbourne Hospital.
11.15 a.m.—Dr. S. V. Sewell: "The Management of Pneumonia," at the Melbourne Hospital.
Dr. J. Tait: "Urinary Calculi," at the Melbourne Hospital.
2.15 p.m.—Dr. G. Scantlebury and Dr. C. Eadie: Demonstrations on ear, nose and throat conditions, at the Melbourne Hospital.
3.30 p.m.—Dr. Bell Ferguson: "Pulmonary Tuberculosis," at the Melbourne Hospital.

Wednesday, August 15, 1928.

9.30 a.m.—Dr. R. P. McMeekin: "Diagnosis and Treatment of Paraplegia," at the Melbourne Hospital.
Dr. Victor Hurley: Demonstrations of patients in the surgical wards of the Melbourne Hospital.
11.15 a.m.—Dr. L. Hurley: "Diabetic Gangrene," at the Melbourne Hospital.
Dr. W. Upjohn: "Some Injuries to the Hips and Knees," at the Melbourne Hospital.
2.15 p.m.—Dr. H. Trumble, Dr. C. J. Brown, Dr. H. Maudsley and Dr. J. Chambers: "Errors in Diagnosis," at the Austin Hospital.
Dr. H. Flecker: "Deep X Ray Therapy in Malignant Disease," at the Austin Hospital.

Thursday, August 16, 1928.

9.30 a.m.—Dr. F. Apperly: "Common Dyspepsias," at the Saint Vincent's Hospital.
Dr. L. Doyle: "Local Anæsthesia," at the Saint Vincent's Hospital.
11.15 a.m.—Dr. L. Latham: Demonstration of patients in the medical wards of the Saint Vincent's Hospital.
Dr. Gordon Shaw: Demonstration of patients in the surgical wards of the Saint Vincent's Hospital.
2.15 p.m.—Dr. J. B. D. Galbraith: "Therapeutic Difficulties in Pædiatrics," at the Children's Hospital.
3.30 p.m.—Dr. M. Stewart: "Birth Injuries of the Brachial Plexus," at the Children's Hospital.

Friday, August 17, 1928.

9.30 a.m.—Dr. Douglas Thomas: "Medical Aspects of Hæmaturia," at the Melbourne Hospital.
Dr. Alan Newton: "Surgery of the Colon," at the Melbourne Hospital.
11.15 a.m.—Dr. W. S. Johnston: "Some Medical Aspects of Dental Sepsis," at the Melbourne Hospital.
Dr. T. E. Lambert: "Injuries to Joints," at the Melbourne Hospital.
2.15 p.m.—Demonstrations at the Eye and Ear Hospital:
Dr. M. Lynch and Dr. W. J. Denehy: "Ear Conditions and Complications."
Dr. G. A. D. McArthur and Dr. H. M. Puckle: "Methods of Rhinological Examination."
Dr. E. Sawrey and Dr. V. P. Johnson: "Rhinological Conditions."
Dr. Mark Gardner and Dr. A. Anderson: "External Eye Diseases and Intraocular Operations."
Dr. J. A. O'Brien and Dr. E. Anderson: "Intraocular Inflammation."
Dr. L. Lawrence: "Fundus Changes."

Special Correspondence.

LONDON LETTER.

By Our Special Correspondent.

Maternal Mortality.

HER MAJESTY THE QUEEN OF ENGLAND, with her characteristic sympathy with her subjects in all matters of health, in a message which she sent to the Maternal Mortality Conference, held in London in February this year, declared that she viewed with great concern the continued high rate of maternal mortality and felt that a real endeavour should be made to remove this reproach from our national life. Such a message as this could not fail of a response and a movement has been started to investigate the subject and find a remedy. The British Government has decided to set up two departmental committees, one to deal with maternal mortality and the other to investigate the subject of midwifery; much interest has been shown in Parliament and in medical circles.

The outstanding fact is that in the British Isles nearly three thousand mothers of a total number of 750,000 lose their lives annually at child-birth and this number has not varied much for many years. The Registrar-General's Statistical Review for the year 1916-1926 inclusive shows but little variation. The best year was 1918 with 2,509 deaths, the worst was 1920 with 4,144 deaths. In 1926, the last year reviewed, there were 2,860 deaths.

What are the factors which cause this lamentable mortality from what is considered a purely physiological occurrence? On looking at the returns one finds that puerperal sepsis and albuminuria account for 60% of the deaths and of these sepsis is twice as deadly as albuminuria. Now albuminuria is a disorder of the puerperium; it follows then that if we control this potent cause of mortality, we must attack the problem before the actual birth of the child. This is being done by the founding of ante-natal clinics of which there were 675 in England and in Wales in 1925 and nearly 800 today. In these clinics there is opportunity for (i) the diagnosis of the pregnancy and the fixing of the probable date of confinement, (ii) examination as to general fitness for pregnancy and labour, (iii) watching for signs of puerperal toxæmia, (iv) measuring the pelvis and (v) detection of abnormal presentation and its correction (W. M. Feldman).

Unfortunately, there is a very general disinclination on the part of pregnant women to attend at these clinics when but a very small part of the work that could be done, is being carried out. It is, of course, purely a matter of education and as the advantages both to mother and to child of ante-natal precautions become better understood, we may reasonably expect a great improvement in the attendances.

The deaths from puerperal sepsis have remained stationary and are not confined to one class. They affect rich and poor, town and country, private or hospital, whether the patients have been attended by doctors or midwives. The mortality in the large lying-in hospitals still amounts to 1·20 per thousand (Eden), a rate not differing much from the general rate. Nor has the incidence of sepsis varied since the introduction of the *Midwives Act* of 1902 which made registration, instruction and supervision of midwives compulsory. There is very little difference between town and country, for though total maternal mortality is higher in rural than in urban areas, the mortality from sepsis is lower in the former than in the latter. When one considers the insanitary conditions which prevail in the lying-in rooms of so many of the poorer mothers, one cannot help feeling that if more women could be admitted to well run lying-in institutions, the mortality figures would be lowered.

In the British Isles mothers are not yet willing to leave their homes and we find that of the average number of 750,000 births only some 20,000 take place in maternity institutions.

But there are causes of mortality other than sepsis and one realizes that the mother's chances of recovery from hæmorrhage, ectopic gestation and *phlegmasia alba dolens*, to mention a few of the accidents of child-birth, would be enhanced by admission to a maternity institution. There is also the very large question of invalidism resulting from child-birth. It is impossible to estimate this incidence, but in this perhaps more than in any other aspect of this great question one can see the value of skilled supervision during the puerperium and the actual child-birth. Nothing but good can come from the action of the Government and the nation may well echo the hope of our Queen that a remedy may be found.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered under the provisions of *The Medical Act*, 1912 *and* 1915, of New South Wales, as duly qualified medical practitioners:

Freemantle, Norman Franklyn, M.B., B.S., 1925 (Univ. Melbourne), Balranald.
Harbison, Alan Thomas, M.B., B.S., 1927 (Univ. Adelaide).
Heath, John Reid, M.B., B.S., 1928 (Univ. Melbourne), Prince of Wales Hospital, Randwick.
O'Neill, Eugene Joseph, M.B., Ch.B., 1899 (Univ. New Zealand), M.R.C.S. (England), 1903. L.R.C.P. (London), 1903, F.R.C.S. (Edinburgh), 1903.

Books Received.

THE MATERIAL AND METHODS OF THE GYNÆCOLOGICAL AND OBSTETRICAL DEPARTMENT IN THE UNIVERSITY OF LIVERPOOL, by W. Blair Bell, B.S., M.D. (London), Hon. F.A.C.S.; 1928. Manchester: Sherratt and Hughes. Crown 4to., pp. 67, with illustrations. Price: 2s. 6d. net.

THE DEVELOPMENT OF THE HUMAN EYE, by Ida C. Mann, M.B., B.S. (London), F.R.C.S. (England); with a foreword by Sir John Herbert Parsons, C.B.E., D.Sc., M.B., F.R.C.S., F.R.S.; 1928. Cambridge: University Press. Royal 8vo., pp. 316, with illustrations. Price: 36s. net.

PRIMARY NEOPLASMS OF THE URINARY BLADDER, by L. R. Fifield, F.R.C.S. (England); 1928. London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 105, with illustrations. Price: 7s. 6d. net.

Diary for the Month.

AUG. 1.—Victorian Branch, B.M.A.: Branch.
AUG. 1.—Western Australian Branch, B.M.A.: Council.
AUG. 2.—South Australian Branch, B.M.A.: Council.
AUG. 3.—Queensland Branch, B.M.A.: Branch.
AUG. 7 and 8.—Federal Committee of the B.M.A. in Australia.
AUG. 7.—Tasmanian Branch, B.M.A.: Council.
AUG. 9.—Victorian Branch, B.M.A.: Council.
AUG. 9.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUG. 10.—Central Southern Medical Association, New South Wales.
AUG. 10.—Queensland Branch, B.M.A.: Council.
AUG. 14.—Tasmanian Branch, B.M.A.: Branch.
AUG. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
AUG. 15.—Western Australian Branch, B.M.A.: Branch.
AUG. 15.—Central Northern Medical Association, New South Wales.
AUG. 17.—Eastern District Medical Association, New South Wales.

Medical Appointments.

Dr. Wilfred Vickers (B.M.A.) has been appointed Honorary Orthopædic Surgeon at the Coast Hospital, Little Bay, New South Wales.

* * * *

Dr. Alfred Austin Lendon (B.M.A.), Dr. Bedlington Howel Morris (B.M.A.), Sir Henry Simpson Newland (B.M.A.), Dr. Richard Sanders Rogers (B.M.A.) and Dr. Herbert Henry Ernest Russell (B.M.A.) have been appointed Members of the Medical Board of South Australia.

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Dr. Sydney Bayly Forgan (B.M.A.) has been appointed Honorary Medical Officer at the Port Pirie Hospital, South Australia.

* * * *

Dr. Edward William Buckley (B.M.A.) has been appointed Government Medical Officer at Tamworth, New South Wales.

* * * *

Dr. Thomas Matthew Donovan has been appointed Government Medical Officer at Richmond, New South Wales.

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Dr. Albert Joseph McShane has been appointed Medical Inspector of Seamen at the Port of Brisbane, Queensland.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

DEPARTMENT OF PUBLIC HEALTH, VICTORIA: Clinical Tuberculosis Officer.

MENTAL DISEASES HOSPITAL, NEW NORFOLK, TASMANIA: Junior Medical Officer.

ROCKHAMPTON HOSPITALS BOARD: General Medical Superintendent.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to position at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor." THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.